

User's manual

TransForm A

X Terminal

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Release X Server	R4.3
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Document history

Modifications, which result in a new version, are indicated by a vertical bar.

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Revision sheet

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1 Introduction

This chapter explains the structure of the manual itself and the used typographic styles and symbols. Safety information is provided concerning the operation of computer systems from Barco.

1.1 How this manual is organized

This manual describes design and startup of TRANSFORM A – X Terminal from Barco. It is divided into nine chapters:

- **Introduction**
explains the structure of the manual itself and the used typographic styles and symbols. Safety information is provided concerning the operation of computer systems from Barco.
- **Summary**
gives an overview about the features of TRANSFORM A.
- **Getting Started**
describes the set up of TRANSFORM A and provides you with a guide through the software configuration. If your TRANSFORM A is already configured within your working place you can skip this chapter and continue with [chapter 4 Operating](#).
- **Operating**
shows the capabilities which TRANSFORM A offers displaying graphics and video. You are introduced into operating the X video client for displaying video and RGB signals and the REMOTE-CONTROL client for controlling an OVERVIEW display wall.
- **Maintenance**
describes the maintenance of TRANSFORM A.
- **Advanced Configuration**
may provide useful information for reconfiguring the software of your TRANSFORM A.
- **Technical Appendix**
gives tabular overviews about the technical details of TRANSFORM A, its components and of their interfaces.
- **Troubleshooting**
gives advice, if your TRANSFORM A does not operate properly.
- **Index**
lists the keywords of the manual.

Chapters, pages, figures and tables are numbered separately. Chapters are indicated by a »point syntax«, e. g. **4.2.3**, pages by a »dash syntax«, e. g. **2-1**, as figures and tables are, e. g. **figure 5-4**.

1.2 Styles and symbols

The typographic styles and the symbols used in this document have the following meaning:

Bold	Labels, menus and buttons are printed in Bold font.
Condensed	Links to both other chapters of this manual and to sites in the Internet are printed condensed . In the on-line version of this manual all hyperlinks appear teal.
Courier	Names of files and parts from programs are printed in the Courier font.
Courier bold	Inputs you are supposed to do from the keyboard are printed in Courier bold font.



Within a piece of programming code this arrow marks a line, that must be made up in two lines, though meant to be one line.



If you do not heed instructions indicated by this symbol there is a risk of damage to the equipment!



If you do not heed instructions indicated by this symbol there is a risk of electrical shock and danger to personal health!



If you do not heed instructions indicated by this symbol there is a risk of damage to parts, which are sensitive toward electrostatic charge!



If you do not heed instructions indicated by this symbol there is a risk to get harmed by sharp objects!



If you do not heed instructions indicated by this symbol there is a risk that parts may explode!



If you do not heed instructions indicated by this symbol there is a risk that hot parts impact persons or objects!



This symbol marks passages concerning solely the distributed system.



The sheet icon indicates additional notes.



Next to this icon you find further information.



This arrow marks tips.



Next to this icon you find important notes.

1.3 Safety instructions

This section describes safety precautions, which must be observed when installing and operating a product from Barco.

1.3.1 Standards

Safety regulations

TRANSFORM A is built in accordance with the requirements of the international safety standard IEC-60950-1, UL 60950-1 and CSA C22.2 No. 60950-1-03, which are the safety standards of information technology equipment including electrical business equipment.

These safety standards impose important requirements on the use of safety critical components, materials and isolation, in order to protect the user or operator against the risk of electric shock and energy hazard, and having access to live parts.

Safety standards also impose requirements to the internal and external temperature variations, radiation levels, mechanical stability and strength, enclosure construction and protection against risk of fire.

Simulated single fault condition testing ensures the safety of the equipment to the user even when the equipment's normal operation fails.

Electromagnetic interference

Electromagnetic emission of TRANSFORM A complies with EN55022, EN61000-3-2, EN61000-3-3 and the limits for a class A digital device, pursuant to Part 15 of the FCC Rules.

Electromagnetic immunity of TRANSFORM A complies with EN55024.



This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

1.3.2 Precautions

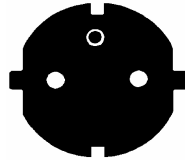


For your own protection, observe the following safety precautions when installing, operating and servicing your device:

- Before operating the units please read this manual thoroughly and retain it for future reference!
- Observe all warnings and instructions printed on the devices!
- Servicing not explicitly mentioned in this manual should never be carried out by unauthorized personnel! Never open the case of the unit without first disconnecting the power supply cord!
- To prevent fire or electrical shock hazard, do not expose this unit to rain or moisture!
- This product should be operated from an AC power source!
- Check that the voltage and frequency of your power supply match those printed on the device label with the rated electrical values!
- If you are not sure of the type of AC power available, consult your dealer or local power company!
- This product is equipped with a 3-wire grounding plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug!
- This equipment must be grounded (earthen) via the supplied 3 conductor AC power cable. (If the supplied power cable is not the correct one, consult your dealer.)

Mains lead (AC power cord) with CEE 7 plug:

The wires of the mains lead are colored in accordance with the following code:



yellow + green	Earth (Ground)
blue	Neutral
brown	Line (Live)

Figure 1-1
CEE 7 plug

Power cord with NEMA 5-15 plug:

- The cord set must be UL-approved and CSA-certified.
- The minimum specification for the flexible cord is No. 18 AWG, Type SVT or SJT, 3-conductor.
- The cord set must have a rated current capacity of at least 10 A.
- The attachment plug must be an Earth-grounding type with a NEMA 5-15P (10 A, 125 V) configuration.

The wires of the power cord are colored in accordance with the following code.

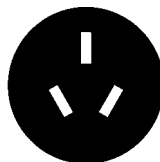


green or yellow + green	Earth (Ground)
blue or white	Neutral
brown or black	Line (Live)

Figure 1-2
NEMA 5-15 plug

Power cord with GB 2099 plug:

The wires of the power cord are colored in accordance with the following code.



yellow + green	Earth (Ground)
blue	Neutral
brown	Line (Live)

Figure 1-3
GB 2099 plug

- Do not allow anything to rest on the power cord. Do not locate this product where people will walk on the cord. To disconnect the cord, pull it out by the plug. Never pull the cord itself.
- If an extension cord is used with this product, make sure that the total of the ampere ratings on the products plugged into the extension cord does not exceed the extension cord ampere rating.
- Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock.
- Never spill liquid of any kind on the product. Should any liquid or solid object fall into the cabinet, unplug the set and have it checked by qualified service personnel before resuming operations.
- Lightning - For extra protection for this video product during a lightning storm or when it is left unattended and unused for a long period of time, unplug it from the wall outlet. This will prevent damage to the unit due to lightning and AC power-line surges.



Due to high touch current, the OmniBus A12 and the OmniBus A18 is intended to be used in a location having equipotential bonding:

- The building installation shall provide a means for connection to protective earth.
- The equipment is to be connected to that means.
- A service person shall check whether or not the socket outlet from which the equipment is to be powered provides a connection to the building protective earth. If not, the service person shall arrange for the installation of a protective earthing conductor from the separate protective earthing terminal to the protective earth wire in the building.

1.3.3 Unpacking of devices

Note advises on the packaging for unpacking!

1.3.4 Installation

- Do not place this unit on an unstable cart, stand, or table. The unit may fall, causing serious damage to it.
- Do not use this unit near water.
- Use only the power cord supplied with your unit. While appearing to be similar, other power cords have not been safety tested at the factory and may not be used to power the unit. For a replacement power cord, contact your dealer.
- Slots and openings in the cabinet and the sides are provided for ventilation; to ensure reliable operation of the unit and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This unit should not be placed in a built-in installation or enclosure unless proper ventilation is provided.
- The maximum recommended ambient temperature for this equipment is 40° C.
- When using the unit in a multi-unit rack assembly or closed assembly the ambient temperature inside the assembly may not exceed the maximum rated ambient temperature.
- When installed in a rack, the installation should be such that the amount of air flow required for safe operation of the equipment is not compromised. The mounting of the equipment should be such that no hazardous condition is achieved due to uneven mechanical loading.

1.3.5 Servicing

Mechanical or electrical modifications others than described in this manual must not be made to the devices. Barco is not liable for damages resulting from modified devices.



Only authorized personnel should carry out other maintenance work not explicitly mentioned in this installation manual!

Never open the case of TransForm A without first disconnecting all power supply cords! Measurements and tests with the opened device may be carried out only in the factory or by specially trained personnel, due to the dangers of electrical shock.

1.3.6 Cleaning

Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. See section [5.2 Cleaning](#) for a cleaning instruction!

1.3.7 Re-packing

Keep the original shipping carton and packing material; they will come in handy if you ever have to ship your unit. For maximum protection, repack your set as it was originally packed at the factory.

1.4 Online manual

On the CD "TransForm A, Documentation & Supplement for X Terminal" **OVT-2686-7** this manual **DOC-3265-2** can also be found in electronic form. Insert the CD in the DVD ROM drive to view the manual. If autorun is enabled on the computer the start page of the CD comes up automatically.

On a Linux computer you may first need to mount the CD by using the following command

```
mount /dev/cdrom /mnt/cdrom
```

and then to open the start page **index.htm** of the CD manually.

On this start page you will find a link to the user's manual of **TransForm A – X Terminal**.

Acrobat Reader can be used to view the file. Adobe® Acrobat® Reader is free and freely distributable software that lets you view and print Adobe Portable Document Format (PDF) files.

If Acrobat Reader is already installed, the manual can be viewed just by a click on the respective link. Else the Acrobat Reader must be installed first. The required installation files can also be found on the CD.

2 Summary

This chapter gives an overview about the features of TRANSFORM A – X Terminal.

2.1 Properties

TRANSFORM A was designed to control large, modular OVERVIEW display walls. Its multi-screen capability allows you to control displays of virtually unlimited size. The display area is one logically connected display. Digital imaging devices based on modern technologies such as DLP and Poly-Silicon LCD with the highest display quality are controlled digitally. Digital data transfer is immune to electromagnetic interference and therefore ensures the display wall picture to be displayed in absolutely distortion free image quality.

Analog monitors and projectors can also be controlled by TRANSFORM A, using the analog output mode of the graphic cards. Thus, multi-monitor operator stations can be ergonomically designed and easily implemented.

(DLP is a trademark of Texas Instruments Incorporated)

The hardware and software of TRANSFORM A is based on world-wide accepted standards. TRANSFORM A offers the following exceptional capabilities:

- High performance graphics output using the most modern processor and chip technologies
- TRANSFORM A OMNIBUS devices with dedicated Switch Fabric and intelligent high-bandwidth backplane provides the optimized resources needed for graphic and video data integration
- Supports current LAN and WAN interfaces
- Graphic and video outputs in high color quality
- Video in a window, up and down scaleable up to full-screen
- Overlapping and freely moveable video and graphics windows of unlimited size
- Up to 68 videos per display channel
- Virtually unlimited number of projection modules in one wall
- Virtually unlimited number of video sources per system
- High reliability, redundancy on system level and for critical components

The TRANSFORM A system provides a flexible and scalable architecture, which is suitable to support all sizes of display walls. For large display walls and high amounts of inserted sources one TRANSFORM A PROCESSOR is used that connects to up to five TRANSFORM A OMNIBUS devices. Smaller systems with up to 24 projection cubes can be set up with a TRANSFORM A PROCESSOR that may use an additional TRANSFORM A EXTENDER depending on the amount of video and RGB sources. For more complex configurations a distributed system can be used consisting of a central PROCESSOR and multiple rendering engines to control a display wall of any size and number of input sources.

Independent of the usage of a monolithic system or a distributed system, both the user and the application software 'see' one single display. Installation, operation and service do not differ from that of a standard X terminal.

TRANSFORM A offers the possibility to operate it in normal boot mode or in eXtended safety boot mode. Normal boot mode offers full write access to the hard disk and enables the operation of the wall management software OSIRIS. eXtended safety boot mode offers in addition to normal boot mode a backup partition for improved system safety. With eXtended safety boot mode the system files are stored safely, and faultless startup is guaranteed even after unpredictable events, e.g. power failure.

TRANSFORM A is the perfect solution for the integration of video and RGB sources into desktop graphic data into digitally controlled display walls. However graphics only systems support also analog display connection.

OmniBus configuration - monolithic system

A TRANSFORM A system that integrates OMniBUS devices is referred to as “OmniBus configuration” further on in this document. In a monolithic system the OMniBUS configuration consists of a PROCESSOR that connects to up to four or five OMniBUS A12 or OMniBUS A18 devices. The PROCESSOR is the host computer of the OMniBUS devices. It is running the operating system and applications and controls the OMniBUS devices where the graphical output is generated and integrated with the video and RGB insertion data.

Such a monolithic system allows controlling more than 100 sources or up to 80 projection modules with the ability to display video and RGB windows anywhere on the wall.

Medium sized systems can be set up with a PROCESSOR and one single OMniBUS.

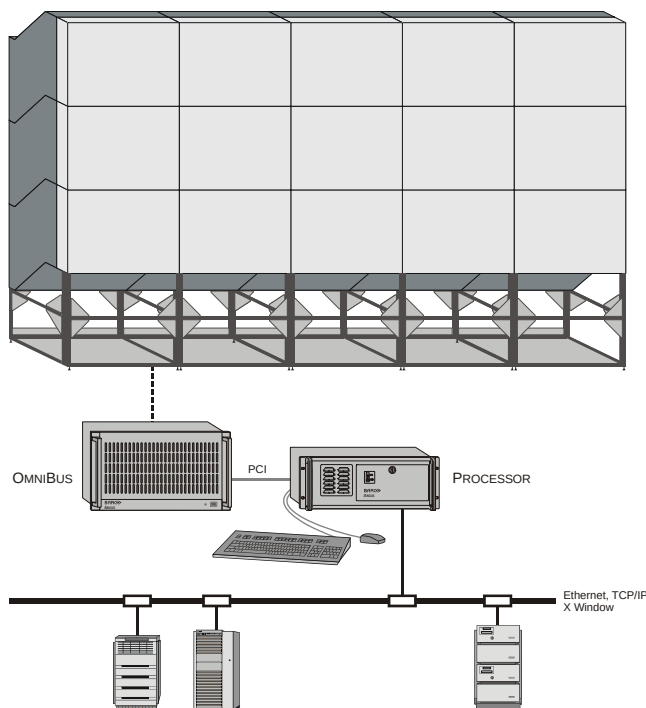


Figure 2-1
15 channel monolithic TRANSFORM A in OMniBUS configuration

Processor configuration - monolithic system

Small systems with one up to 24 projection cubes can be set up with a single PROCESSOR. Depending on the amount of video and RGB sources an additional EXTENDER may be used. This setup is called “Processor configuration”.

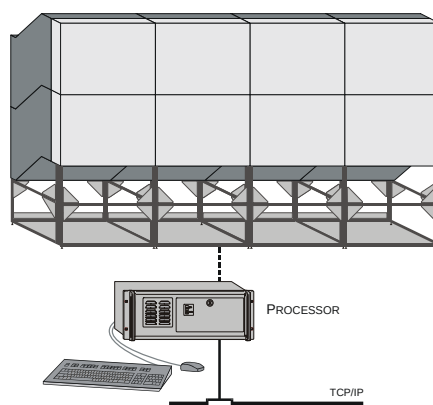


Figure 2-2
8 channel PROCESSOR in Processor configuration

Distributed system

In a distributed system one PROCESSOR is used as central device. It is equipped with keyboard and mouse. Via a sub-net the central PROCESSOR controls the rendering machines. Each rendering machine consists of a PROCESSOR used as rendering PROCESSOR and one or two OMNIBUS devices. The rendering PROCESSOR is the host computer of its one or two OMNIBUS devices.

The distributed system enables to set up display walls of any size where video windows can freely be moved. It can be used within an OmniBus configuration as well as in a Processor configuration

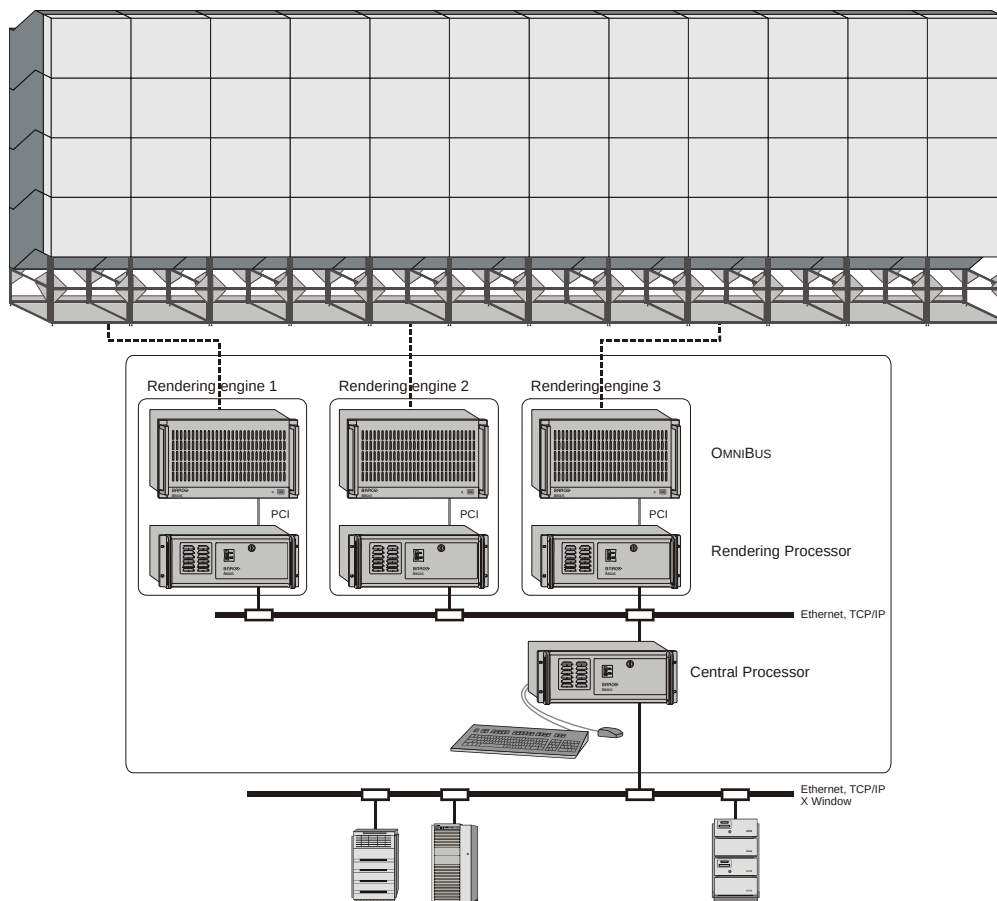


Figure 2-3
48 channel distributed system in an OmniBus configuration

3 Getting started

This chapter describes the set up of TRANSFORM A – X Terminal and provides you with a guide through the software configuration.

If your TRANSFORM A is already configured within your working place you can skip this chapter and continue with chapter [4 Operating](#).

3.1 Examining

3.1.1 Processor

The PROCESSOR is available in several configurations differing in the type of the CPU, the power supply, and the system mainboard. The table below lists the possible configurations and related product codes which are used further on to indicate a particular device where applicable:

	standard power supply	redundant power supply
Pentium® IV 3.4 GHz, 6 PCI slots	AGS-3328-2	AGS-3328-3
Pentium® IV 3.6 GHz, 4 PCI slots, 3 PCIe slots	AGS-3389-0	AGS-3389-1
Core™ 2 Duo 2.13 GHz, 4 PCI slots, 3 PCIe slots	AGS-3389-2	AGS-3389-3
Single Xeon® Dual-Core, 6 PCI slots	–	AGS-3390-2

The front

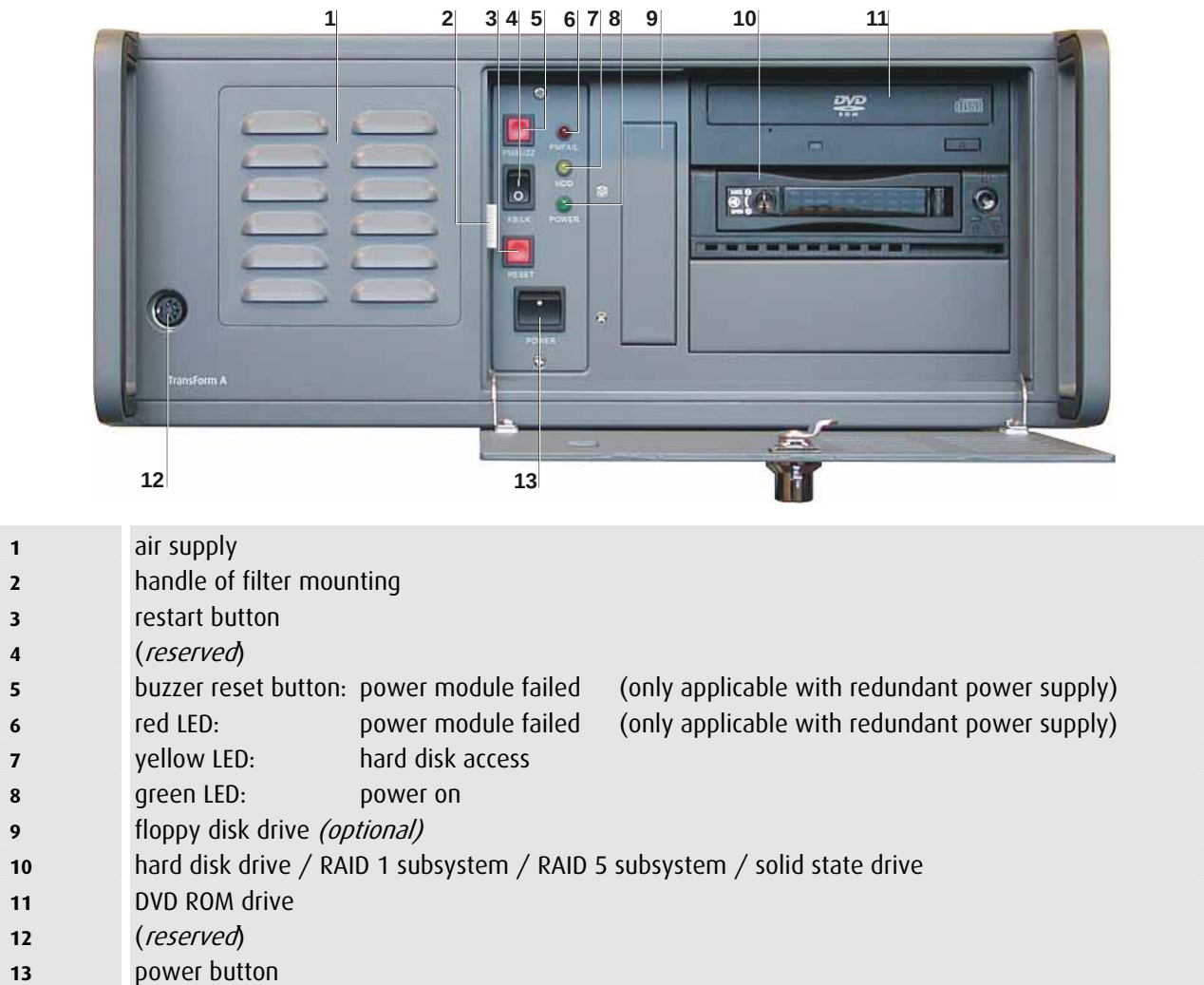


Figure 3-1
front view of the PROCESSOR

Next to the air supply openings [1] there is the handle of the filter mounting [2]. In the center behind the front flap there are from top to bottom the **buzzer reset button** for power module failure [5], the **lock keyboard switch** [4] followed by the **restart** button [3] and finally the **power** button [13]. Next to these buttons to the right side there are three LEDs. In the top position there is a red LED, indicating **power module failure** [6] of a redundant power module. The yellow LED indicates **hard disk access** [7] and the green LED indicates **power on**

[8]. On the right hand side there is optionally the floppy disk drive [9], followed by the DVD ROM drive [11] and below it the hard disk drive [10].

There are hard disks with parallel ATA (PATA) and serial ATA (SATA) available. They come as standard hard disks, RAID 1 hard disk system, RAID 5 hard disk system or solid state drive. PATA hard disks may be used in PROCESSOR models AGS-3328, AGS-3389 or AGS-3390, SATA hard disks may only be used in PROCESSOR models AGS-3389 and AGS-3390.

The figure above [front view of the Processor](#) includes the frame for the SATA standard hard disk drive and the solid state drive.

The frame of the SATA hard disk or solid state drive for AGS-3389 or AGS-3390 has on its left side of the front a lock, which prevents from un-mounting the hard disk unintentionally.



While turning the lock it is easily possible to un-mount the hard disk. Therefore only turn the lock, if the PROCESSOR is switched off.



Figure 3-2
SATA hard disk

Each SATA RAID 5 hard disk provides three LEDs at the front of the removable frame. If the red LED lightens permanently, this indicates that this particular hard disk has failed and should be replaced.

The extensive documentation of the LED codes can be found on the documentation CD of the RAID system.



Please note for the SATA RAID 5 systems:

A hard disk is already switched off by turning the frame lock key!

Never remove more than one hard disk while the system is running. Never remove any hard disk while the system is in rebuilt mode or switched off. Otherwise the system will crash and it can not be restored!

Never change the sequential order of the hard disks. Otherwise the complete data on the drives will get corrupt and it can not be restored!

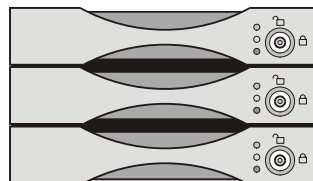


Figure 3-3
SATA RAID 5 hard disk drives

The SATA RAID 1 hard disk drive system looks similar, but has instead of the hard disk in the middle position a row of eight indicators, which display the different operating modes of the system.

The extensive documentation of the LED codes can be found on the documentation CD of the RAID system.



Please note for the SATA RAID 1 systems:

A hard disk is already switched off by turning the frame lock key!

A hard disk should not be replaced when the system is turned off. Doing so may lead to loss of data.

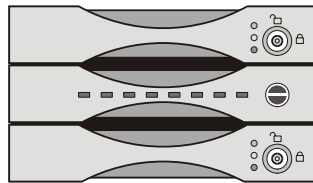
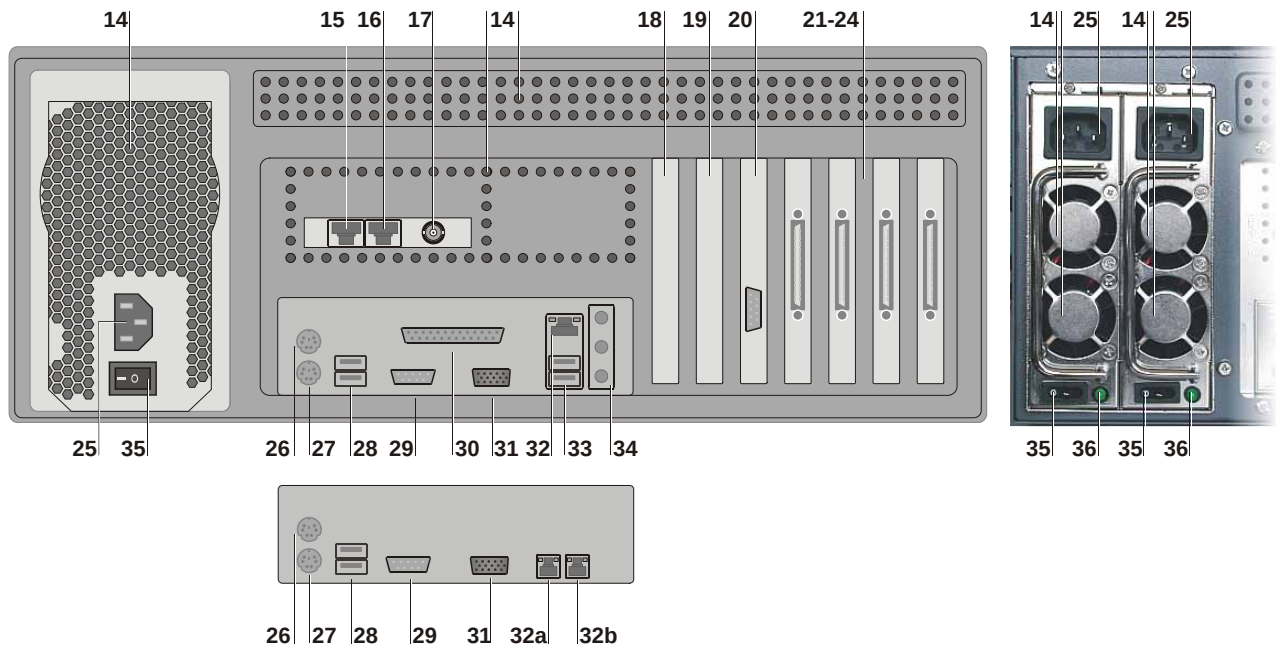


Figure 3-4
SATA RAID 1 hard disk drives

The back

PROCESSOR with standard power supply (left) and detail of a PROCESSOR with redundant power supply (right):



14	air supply	
15	genlock loop through in	
16	remote power on/off connector / genlock loop through out	
17	external genlock in	
	models AGS-3328-2/-3 and AGS-3390-2	models AGS-3389-0/-1/-2/-3
18	COM2	PCIe ×16 extension cards
19	PCI extension cards ...	PCIe ×1 extension cards
20	PCI extension cards ...	COM2
21-24	PCI extension cards like network cards, link interface cards, Barco's expansion cards etc. (<i>depending on configuration</i>)	
25	mains connection of power module	
26	PS/2 mouse (<i>green jack</i>)	
27	PS/2 keyboard (<i>purple jack</i>)	
28	2×USB	
29	COM1	
30	LPT1	
31	onboard VGA adapter	
32	onboard LAN adapter with the following LED signals:	
	left LED	lights green a connection exists
		blinking green activity
	right LED	off 10 Mbps connection
		lights green 100 Mbps connection
		lights amber 1000 Mbps connection
33	2×USB (<i>not on AGS-3390-2</i>)	
34	audio, micro (<i>not on AGS-3390-2</i>)	
35	power switch of power module	
36	green LED: individual power module operating	

Figure 3-5
rear view of the PROCESSOR with standard power supply (left), detail with redundant power supply (right)
and details of the rear connection plate of the PROCESSOR AGS-3390-2 (bottom)

On the left hand side is the **mains connection** [25]. At the case of a PROCESSOR with redundant power supplies there is for both of the two power modules a **mains connection** [25] and additionally a **power switch** [35] and an **LED** [36] that indicates operation of the power module when lightened. In the middle of the power modules there is the air supply [14].

The **remote power on/off connector** [16] is for connection to OMNIBUS devices. With the optional connectors **external genlock in** [17] and **external genlock loop through in** [15] an external genlock signal can be connected to multiple PROCESSORS and OMNIBUS devices.

PS/2 mouse [26] is for plugging in a PS/2 mouse and **PS/2 keyboard** [27] is for plugging in a PS/2 keyboard. For USB mouse and USB keyboard the **USB plugs** [28] can be used. With the **onboard LAN adapter** [32] the network connection can be established.

On the right hand side there are different PCI and PCI Express cards [18-24] inserted depending on the actual hardware configuration of the PROCESSOR.



To protect the Processor from overheating, the air supply openings in the case shall be kept free of obstructions!



To disconnect the Processor from the power supply all power cords have to be pulled of the mains connection [25]. Therefore the back panel has to be easily accessible!

The expansion slots

The PROCESSOR AGS-3328-2/-3 and AGS-3390-2 provide each six PCI expansion slots for insertion of PCI expansion cards. Whereas the PROCESSOR AGS-3389 provide four PCI expansion slots for insertion of PCI expansion cards and three PCI Express expansion slots for insertion of 3rd party expansion cards. The slots are numbered in the following way, if looking from the back to the PROCESSOR:

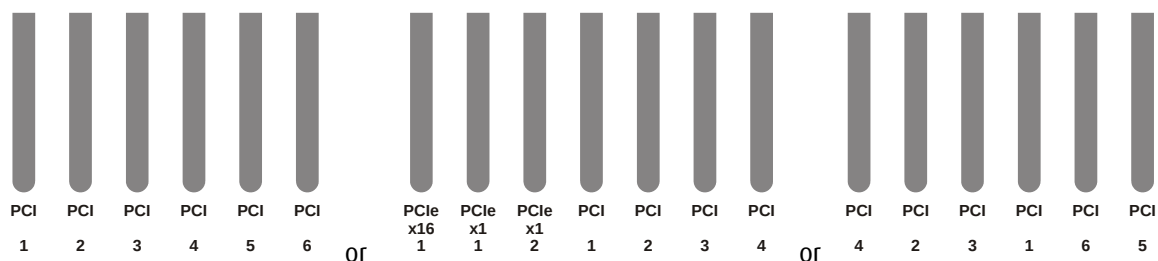


Figure 3-6
numbering of expansion slots on the back panel of the PROCESSOR:
AGS-3328-2/-3 (left) or AGS-3389 (middle) or AGS-3390-2 (right)



With AGS-3390-2 in Processor configuration the PCI slot no. 5 as numbered in the figure above may not be used for input cards due to mechanical requirements. In a configuration where all PCI slots are used the input card may be inserted into the PCI slot of an OmniScaler instead.

In the following sections reference is taken to the numbering of the slots.

3.1.2 OmniBus A12

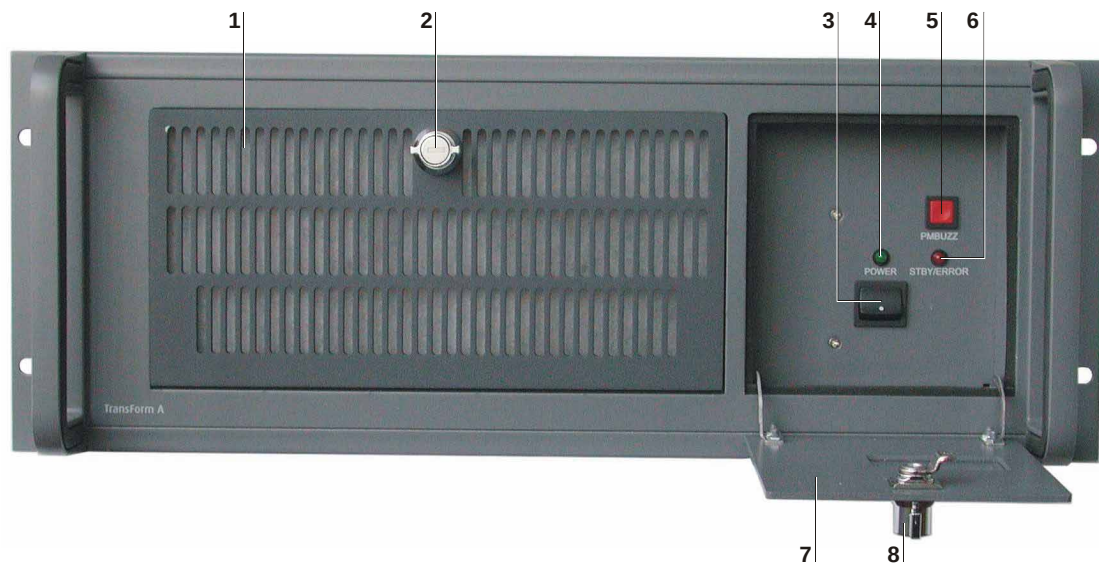
Each OMNIBus A12 provides twelve PCI expansion slots. They can be used for Barco's UGX GRAPHIC CARDS, OMNISCALERS, QUAD ANALOG VIDEO CARDS, DUAL DVI INPUT CARDS, DUAL RGB INPUT CARDS, STREAMING VIDEO CARDS and QUAD SDI VIDEO CARDS.



Although the backplane of the OmniBus A12 is based on standard 64bit/66MHz PCI bus it is highly recommended to not insert other cards than those mentioned above.

Other cards will not work due to the missing driver support and there is also a risk to damage the OmniBus A12 or the inserted cards.

The front

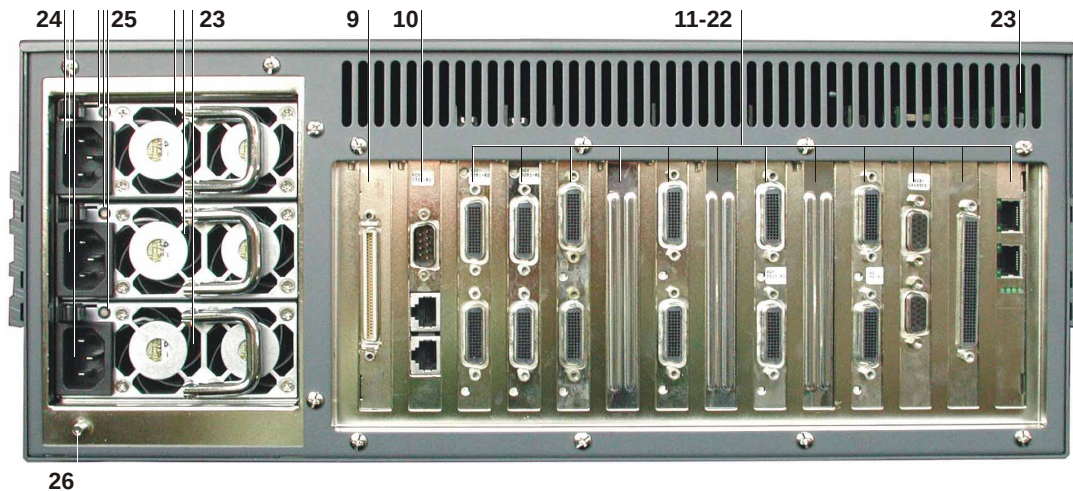


1	ventilation flap with air supply
2	lock of ventilation flap
3	On/Off-switch
4	green LED: power on
	on power is switched on
	off power is switched off
5	buzzer reset button: power module failed
6	red LED: standby / component failed
	on standby mode: Power applies at the device but it is not switched on.
	off device is switched on, no component failed or device is off, no power applies
	blinking Component failure detected (e.g. one power module failed, fan failed, over-temperature in the device detected), the LED stops blinking when the component fail disappears.
7	front flap
8	lock of front flap

Figure 3-7
Front view of OMNIBus A12

Behind the front flap of the OMNIBus A12 on the lowest position, there is the **On/Off-switch** [3]. On the top position is a **buzzer reset button** [5] to confirm the failure of a redundant power module. Between these two buttons there are two LEDs; the green LED **power on** [4] to the left is indicating if power is on. The red LED **standby / component failed** [6] to the right indicates that a redundant power module is not operable.

The back



9	link interface card
10	CPU board
11-22	Barco's expansion cards
23	ventilation slots
24	mains connection of power module
25	LED: power status of power module
	permanent red standby mode: Power applies at the module but the device is not switched on.
	permanent green power module OK, power output OK
	off power connection is interrupted
26	connection for equipotential bonding conductor

Figure 3-8
Rear view of OMniBUS A12

In total there are 14 card slots visible from the back, with the left two positions having a fixed assignment for the **link interface card** [9] and the **CPU board** [10]. **Graphic cards, OmniScalers and input cards** [11-22] follow, depending on the configuration of TRANSFORM A.

On the left there are three power modules each with a **mains connection** [24] and a LED to indicate the **power status** [25]. On the lower part there is a **connection for the equipotential bonding conductor** [26].



To disconnect the OMniBUS A12 from the power supply all power cords have to be pulled of the mains connection [24]. Therefore the back panel has to be easily accessible!



To protect the OMniBUS A12 from overheating, the air supply openings in the case shall be kept free of obstructions!



To ensure power redundancy take care to connect each of the power modules to an independent power net.

The expansion slots

The OMNIBus A12 provides 12 PCI slots [11-22] for insertion of UGX GRAPHIC CARDS, OMNISCALE, QUAD ANALOG VIDEO CARD, DUAL DVI INPUT CARDS, DUAL RGB INPUT CARD, QUAD SDI VIDEO CARD and STREAMING VIDEO CARD.

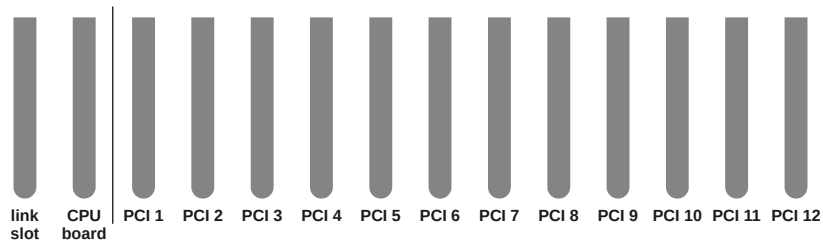


Figure 3-9
numbering of slots on the back panel of OMNIBus A12

Connector **CPU board** is reserved for the CPU board and connector **link slot** is reserved for the connection to PROCESSOR. In the following sections reference is taken to the numbering of the PCI slots 1 – 12.

3.1.3 OmniBus A18

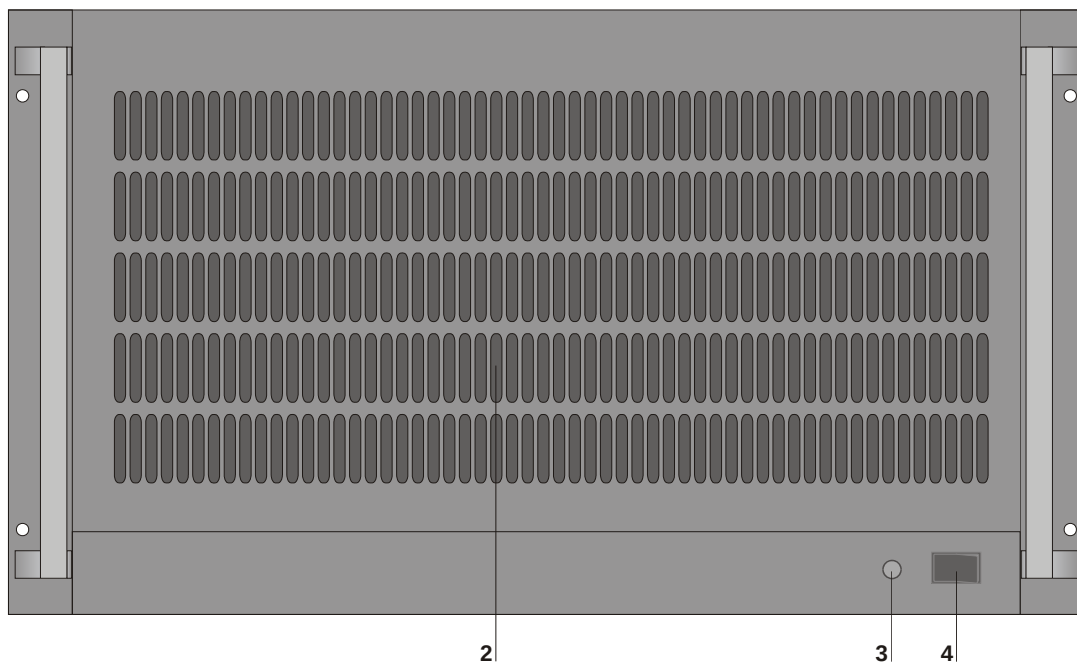
Each OMNIBus A18 provides eighteen PCI expansion slots. They can be used for Barco's UGX or AGX GRAPHIC CARDS, OMNISCALERS, QUAD ANALOG VIDEO CARDS, DUAL DVI INPUT CARDS, DUAL RGB INPUT CARDS and STREAMING VIDEO CARDS and QUAD SDI VIDEO CARDS.



Although the backplane of the OmniBus A18 is based on standard 64bit/66MHz PCI bus it is highly recommended to not insert other cards than those mentioned above.

Other cards will not work due to the missing driver support and there is also a risk to damage the OmniBus A18 or the inserted cards.

The front



2	Ventilation flap with air supply
3	LED: operating status
off	power switch [26] on the back switched off
red	power switch [26] switched on, system in stand-by
green	power switch [26] switched on, OMNIBus A18 is started, either by the On/Off push button [4] or via the remote power cable by the PROCESSOR. All power modules that are currently in the OMNIBus A18 are working well.
red blinking	Power failure at one power module (only with redundant power supplies) One housing fan runs too slow or not at all Overtemperature at temperature sensors on the backplane or CPU board.
4	Push button On/Off

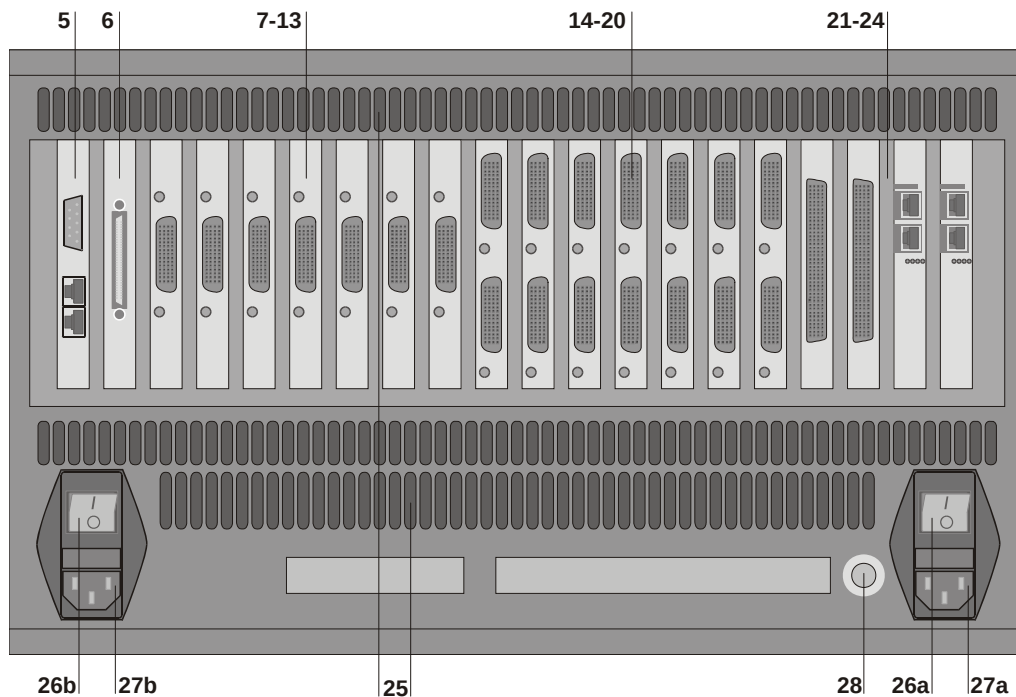
Figure 3-10
Front of the OMNIBus

On the front of the OMNIBus A18 at the bottom to the right there is the **On/Off push button** [4]. Next to it there is an **LED** [3], showing the operating status of the OMNIBus A18.



**In an OmniBus A18 with redundant power supply the LED [3] also lights up green, if one of the two power modules is removed but the remaining power module is working well.
It is not an indicator that redundancy is available!**

The back



5	CPU board
6	link interface card
7-13	Barco expansion cards, e.g. graphic cards
14-20	Barco expansion cards, e.g. OMNISCALER
21-24	Barco expansion cards, e.g. input cards
25	air supply
26a, 26b	power switch (a standard power module, b optional redundant power module)
27a, 27b	mains connection (a standard power module, b optional redundant power module)
28	connection for equipotential bonding conductor

Figure 3-11
back of OMNIBus A18

On the upper part of the back of the OMNIBus A18 there are different cards. On the left there is the **CPU board** [5] and the **link interface board** [6], followed by **graphic cards**, **OMNISCALERS** and **input cards** [7-24] depending on the configuration of TRANSFORM A.

On the right of the lower part is the standard **mains connection** [27a] and the **power switch** [26a]. On the left side there may be another **mains connection** [27b] and the **power switch** [26b] for a second power module for redundant operation, depending on the configuration of the TRANSFORM A. To the left of the standard mains connection there may be a **connection for the equipotential bonding conductor** [28].



To protect the OMNIBus A18 from overheating, the air supply openings in the case shall be kept free of obstructions!



To disconnect the OMNIBus A18 from the power supply all power cords have to be pulled of the mains connection [27a] and [27b]. Therefore the back panel has to be easily accessible!

The expansion slots

The OMNIBus A18 provides 18 PCI slots [7-24] for insertion of UGX or AGX GRAPHIC CARDS, OMNISCALER, QUAD ANALOG VIDEO CARD, DUAL DVI INPUT CARDS, DUAL RGB INPUT CARD, QUAD SDI VIDEO CARD and STREAMING VIDEO CARD.

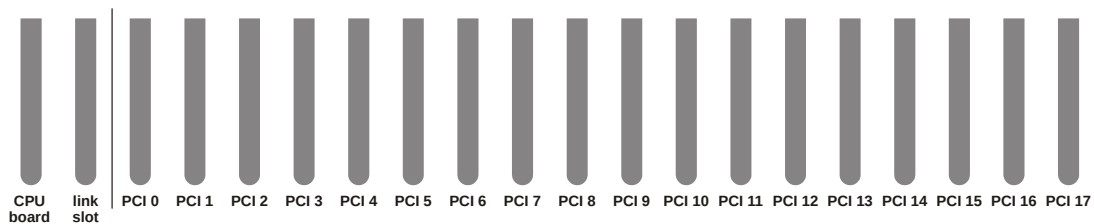


Figure 3-12
numbering of slots on the back panel of OMNIBus A18

Connector **CPU board** is reserved for the CPU board and connector **link slot** is reserved for the connection to PROCESSOR. In the following sections reference is taken to the numbering of the PCI slots 0 – 17.

3.1.4 Extender

In a typical Processor configuration the PCI slots of the PROCESSOR are used for inserting all expansion cards. The EXTENDER extends the PROCESSOR by adding 13 PCI slots. Thus a bigger number of projection modules or more input sources can be connected in a Processor configuration. The EXTENDER is equipped with a redundant hot plug power supply.

Small systems, which exceed the number of available slots in the PROCESSOR can either be configured as an Omni-Bus configuration or as a Processor configuration with an EXTENDER, if the input requirements are moderate and the slots of an EXTENDER sufficient.

The front

The EXTENDER looks like this or similar:

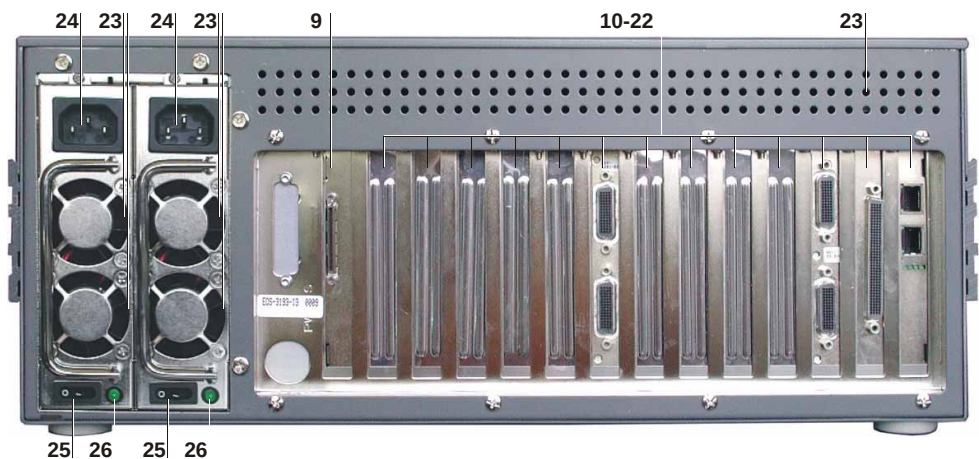


1	ventilation flap with air supply
2	lock of ventilation flap
3	On/Off-switch
4	green LED: power on
	on power is switched on
	off power is switched off
5	buzzer reset button: power module failed
6	red LED: power module failed
	on One power module has failed or power connection to a module is interrupted.
	off device is switched on, power modules OK, power output OK or device is off, no power applies
7	front flap
8	lock of front flap

Figure 3-13
Front view of the EXTENDER

On the front of the EXTENDER behind the front flap [7] on the lowest position, there is the **On/Off-switch** [3]. On the top position is a **buzzer reset button** [5] to confirm the failure of a redundant power module. Between these two buttons there are two LEDs, the green LED **power on** [4] to the left is indicating if power is on. The red LED **power module failed** [6] to the right indicates that a redundant power module is not operable.

The back



9	link interface card
10-22	slots for Barco's expansion cards
23	ventilation slots
24	mains connection
25	power switch of power modules
26	green LED: individual power module operating

Figure 3-14
rear view of EXTENDER

In total there are 14 card slots visible from the back, with the most left position having a fixed assignment for the **link interface card** [9]. **Graphic cards, OmniScalers** and **input cards** [10-22] follow, depending on the configuration of TRANSFORM A.

On the left there is the power supply with the **mains connection** [24]. Each power module has an individual **power switch** [25] and a **green LED** [26] that indicates the operation of the power module.

The expansion slots

The EXTENDER provides 13 PCI slots in two PCI segments:

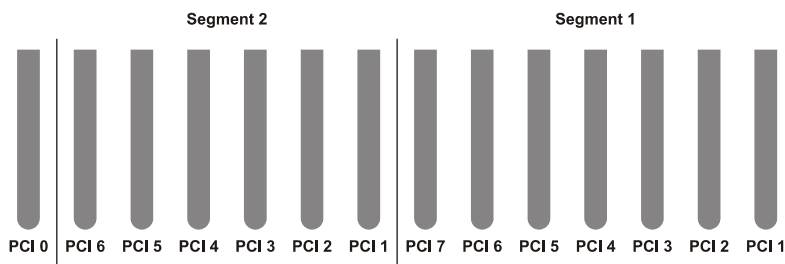


Figure 3-15
PCI Slots and Segments

Connector **PCI 0** is reserved for the link interface card to connect to the PROCESSOR.

3.2 Cabling

3.2.1 Power supply



Check the power rating on your outlet before connecting the devices of TRANSFORM A to the wall outlet or to a power strip. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.



TRANSFORM A is designed to operate with single-phase power systems having a grounded neutral conductor. To reduce the risk of electrical shock, do not plug into any other type of power system.

To connect PROCESSOR, OMNIBUS devices or EXTENDERS to the power supply, follow these steps:

- If using an OMNIBUS with redundant power supply first connect an equipotential bonding conductor to the connector [28] (Figure 3-11) at an OMNIBUS A18 and connector [26] (Figure 3-8) at an OMNIBUS A12 respectively.
- Plug the female end of the power cords into the mains connections of each PROCESSOR [25] (Figure 3-5), OMNIBUS A12 [24], OMNIBUS A18 [27] and EXTENDER [24] (Figure 3-14) respectively.

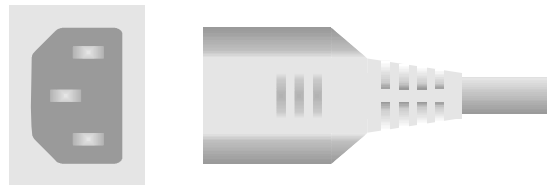


Figure 3-16
Mains connection

- Plug the male end of each power cord into a power outlet.

3.2.2 Mouse

The standard mouse is a USB optical mouse with a PS/2 adapter. Either plug it with its PS/2 adapter into the **PS/2 mouse** jack [26] or plug USB connector into one of the **USB plugs** [28] of the PROCESSOR.



Figure 3-17
mouse connection via PS/2 (left) and via USB (right)

3.2.3 Keyboard

The standard keyboard is a **USB keyboard**. Plug it into one of the **USB plugs** [28] of the PROCESSOR.



Figure 3-18
keyboard connection via USB

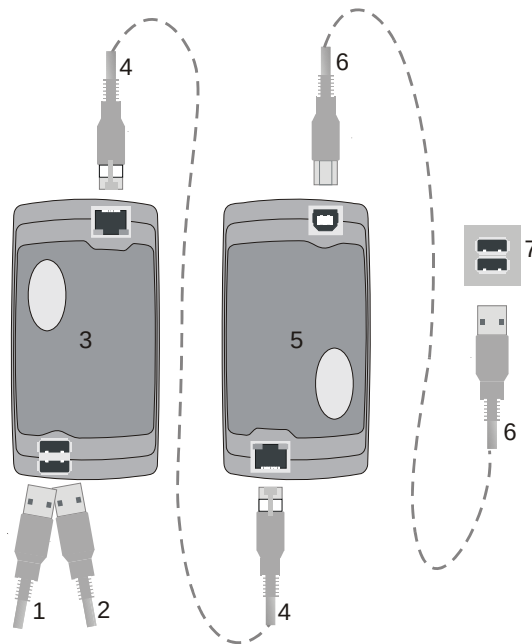
3.2.4 Keyboard extension

The keyboard extension allows a distant positioning of keyboard and mouse.

The figure below shows schematically the parts and the cabling of the keyboard extension.

The keyboard extension is made up of two extension boxes (**remote extension box REX** [3], **local extension box LEX** [5]) and two connection cables (**RJ-45 connection cable 20m** [4], **USB cable** [6]). Keyboard and mouse are plugged into the **remote extension box** instead of being plugged directly into the PROCESSOR. The **remote extension box** is connected to the **local extension box** with the **connection cable 20m**.

The **local extension box** is connected to an **USB port** of the PROCESSOR with the provided **USB cable**, which has on the one end a USB-A plug and on the other a USB-B plug.



- | | |
|----------|--|
| 1 | mouse |
| 2 | keyboard |
| 3 | remote extension box REX |
| 4 | RJ-45 connection cable 20 m (or optionally 50 m) |
| 5 | local extension box LEX |
| 6 | USB cable |
| 7 | USB plugs at the back of the PROCESSOR |

Figure 3-19
USB Keyboard extension



The RJ-45 connection cable is not meant to connect REX and LEX via a network. The RJ-45 connectors of LEX and REX must be connected directly with each other!

3.2.5 Graphic cards

The DDC capable UGX and AGX GRAPHIC CARDS provide the facility for connecting CRT monitors or projectors (analog mode) or for connecting Barco projection modules (digital mode) to TRANSFORM A. By means of a rotary switch on the board they can easily be switched between analog and digital mode.

For TRANSFORM A systems with digital output and video or RGB insertions the output of the graphic cards is led over to OMNISCALERS and then connected to the display device. Please refer to section [3.2.6 OmniScaler](#).

Connectors

The UGX GRAPHIC CARD provides two Dual-DVI connectors to connect four display devices. For digital output, resolutions up to 1920x1200 can be processed.

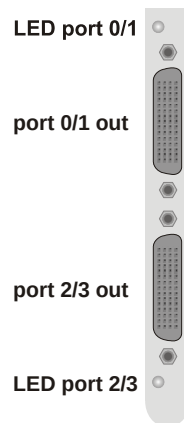


Figure 3-20
Ports of UGX GRAPHIC CARD



DDC capable display devices must be connected to the graphic cards before TransForm A is switched on. If they are connected afterwards, TransForm A will not be able to detect them!

Specifications

For detailed technical specifications of the graphic cards please refer to section [7.1 Technical data](#).

Depending on the configuration the card is delivered with different adapter cables:

- **Dual-DVI to 2xDVI-D adapter cable:**
Digital output for display on projection modules with digital input.

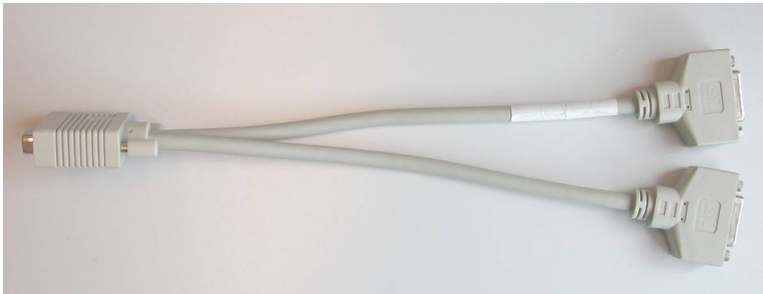


Figure 3-21
Dual-DVI to 2xDVI-D adapter cable

- **Dual-DVI to 2xCRT adapter cable:**
Analog output for display on projection modules with analog input.



Figure 3-22
Dual-DVI to 2xCRT adapter cable

Order

The first graphic card in respect to PCI slot numbering identifies itself as primary graphic adapter by lighting the green LED of the respective graphic channel when TRANSFORM A is switched on. The primary graphic adapter is the channel, where the system emits diagnostic and status messages during system startup.

- **In an OmniBus configuration** the graphic cards are plugged into the OMNIBus devices. For the explicit order of the graphic cards, please refer to the sections [3.2.16 OmniBus](#).
- **In a Processor configuration** graphic cards are in most cases plugged in the PROCESSOR. If multiple graphic cards are used the other graphic cards should be inserted in sequence to the primary graphic adapter into the PCI slots and are numbered consequently following their numbering. Please refer also to section [3.2.17 Extender](#).

Each UGX GRAPHIC CARD provides four ports for connecting projection cubes, monitors or projectors. The upper connector contains **port 0** and **1**, the lower one contains **port 2** and **3**. Thus the sequence of the graphic channels is:

board	1				2				3			
port	0	1	2	3	0	1	2	3	0	1	2	3
channel	1	2	3	4	5	6	7	8	9	10	11	12

Figure 3-23

For non default sequence see section [6.1.6 Advanced configuration of Transform A](#).

The Barco projection modules are assigned from left to right (view from in front of the screens) or if arranged in a square numbered in rows starting at the top left:

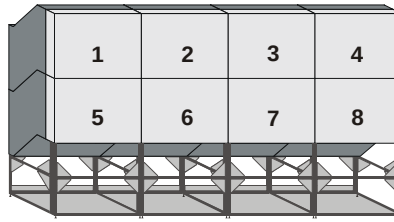


Figure 3-24
Numbering of projection channels



This numbering is carried on for distributed systems. For each rendering machine the modules are numbered as described.

VGA-adapter



For configuring a distributed system, the graphical output of the central device must be displayed somewhere. Therefore a VGA monitor can be connected to the onboard VGA adapter of the central processor, please refer to section [3.1.1 Processor](#).

3.2.6 OmniScaler

In addition to graphic cards, also OMNISCALERS are a substantial part of TRANSFORM A to connect to projection modules. The OMNISCALERS provide the ability to integrate video and RGB data into the graphical data from the graphic cards. Therefore the **out** connector of the graphic card needs to be connected to the **in** connector of the OMNISCALER. Only graphic cards in digital mode can be connected. DDC information from the projection device is looped through to the graphic card for further processing.

Connectors

The OMNISCALER provides one Dual-DVI connector for data insertion from the graphic card and one Dual-DVI connector for digital output for two projection modules.

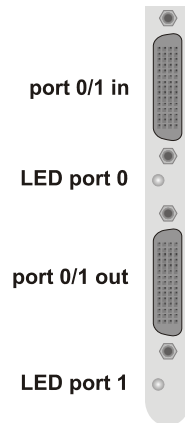


Figure 3-25
ports of the OMNISCALER

In every OMNISCALER card package a Dual-DVI to Dual-DVI cable is included. It serves to connect **port 0/1 in** of the OMNISCALER with **port 0/1** or **port 2/3** of the graphic card:



Figure 3-26
Dual-DVI to Dual-DVI adapter cable

For the connection to the projection modules the Dual-DVI to 2×DVI-D adapter cable that was provided with the graphic card is used. It must be plugged into **port 0/1 out** of the OMNISCALER.

Order

The OMNISCALER that is connected to the first graphic card (as primary graphic adapter) lightens also the green LED of the respective graphic channel.

- **In an OmniBus configuration** the OMNISCALERS are inserted into the PCI slots of the OMNIBUS devices, please refer to section [3.2.16 OmniBus](#).
- **In a Processor configuration** the OMNISCALERS may be inserted in the PCI slots of the PROCESSOR or the EXTENDER. If more than one OMNISCALER is built-in, they are numbered in the sequence of the PCI slots, please refer to section [3.2.17 Extender](#).

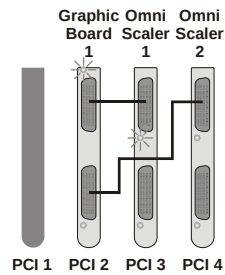


Figure 3-27
Example for connecting OMNISCALERS with the graphic card in a PROCESSOR AGS-3389

Specifications

For detailed technical specifications of the OMNISCALER please refer to section [7.1 Technical data](#).

3.2.7 Quad Analog Video Card

The QUAD ANALOG VIDEO CARD provides the capability of displaying video signals like VCR, TV, CCTV etc. The analog video signals are digitized for further processing in TRANSFORM A. Four video signals can be processed simultaneously.

Standard

The video standard Composite Video (VHS, FBAS, CVBS, CVS, Y) is supported.

Connectors

The QUAD ANALOG VIDEO CARD provides four BNC connectors for video insertion.

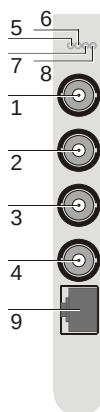


Figure 3-28
connectors of QUAD ANALOG VIDEO CARD

1	video channel 1
2	video channel 2
3	video channel 3
4	video channel 4
5	green LED channel 1
6	green LED channel 2
7	green LED channel 3
8	green LED channel 4
9	RJ45 GPIO connector (<i>reserved</i>)

Table 3-1
channels of the QUAD ANALOG VIDEO CARD

Order

Within a single QUAD ANALOG VIDEO CARD the numbering of the video channels is as shown in the figure above. The order in that the input cards are inserted into TRANSFORM A is as follows:

- **In an OmniBus configuration** the input cards are plugged into the PCI slots of the OMNIBus devices, please refer to section [3.2.16 OmniBus](#).
- **In a Processor configuration** the input cards are inserted into the PCI slots following the OMNISCALERS. If more than one input card is built-in, they are numbered in the sequence of the PCI slots, please refer to section [3.2.17 Extender](#).

Specifications

For detailed technical specifications of the QUAD ANALOG VIDEO CARD please refer to section [7.1 Technical data](#).

3.2.8 Streaming Video Card

The STREAMING VIDEO CARD provides the capability of displaying compressed encoded digital video streams. The digital signal is decoded for further processing in TRANSFORM A. Up to four video streams can be processed simultaneously. The STREAMING VIDEO CARD allows a redundant connection to the Ethernet. The card exists in two different versions: STREAMING VIDEO CARD SVC-1 and STREAMING VIDEO CARD SVC-2.

Standard

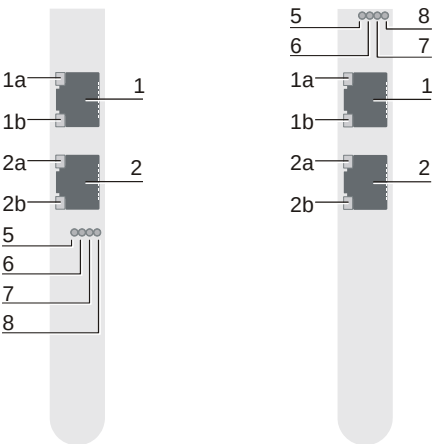
The STREAMING VIDEO CARD supports the following stream types over Ethernet:

type	supported stream types
STREAMING VIDEO CARD SVC-1	MPEG-2, MPEG-4, MJPEG, MxPEG, 2D-Wavelet and TRANSFORM SCN streams
STREAMING VIDEO CARD SVC-2	MPEG-2, MPEG-4 and visiowave streams

Table 3-2
Supported stream types of STREAMING VIDEO CARD

Connectors

The STREAMING VIDEO CARD provides two RJ45 connectors to establish the connection to the network. For a redundant connection a network cable should be plugged into each of the plugs [1] and [2]. These network cables should connect on the other side to a redundant network. In case of a failure of one connection the other connection will take over the complete network traffic. If a redundant connection is not required either plug [1] or plug [2] can be used for the connection. Both plugs use the same IP and MAC address, so no configuration in regard of the used plug is required.



1	RJ45 Network connector 1 video network (10/100Mbps on SVC-1, 100/1000Mbps on SVC-2)
2	RJ45 Network connector 2 video network (10/100Mbps on SVC-1, 100/1000Mbps on SVC-2)
a	green LED: ON – connected to the Ethernet
b	green LED: ON – connected with 100 Mbps (SVC-1) / 1000 Mbps (SVC-2) OFF – connected with 10 Mbps (SVC-1) / 100 Mbps (SVC-2)
5	stream 1 is active
6	stream 2 is active
7	stream 3 is active
8	stream 4 is active

Figure 3-29
connectors of the STREAMING VIDEO CARD– SVC-1 (left) and SVC-2 (right)

Order

For the order in that the input cards are inserted into TRANSFORM A, please see section 3.2.7 Quad Analog Video Card.

Specifications

For detailed technical specifications of the STREAMING VIDEO CARD please refer to section [7.1 Technical data](#).

3.2.9 Quad SDI Video Card

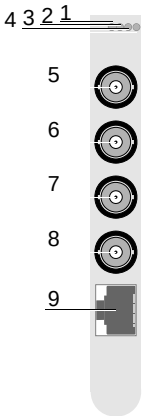
The QUAD SDI VIDEO CARD provides the capability of displaying SDI video signals. The digital video signals are processed for further usage in TRANSFORM A. Four video signals per QUAD SDI VIDEO CARD can be processed simultaneously.

Standards

The QUAD SDI VIDEO CARD supports the standard SMPTE 259M-C (4:2:2, 270Mbps only).

Connectors

The QUAD SDI VIDEO CARD has four BNC connectors to connect four SDI sources. To each input there is a LED associated.



1	green LED channel 1
2	green LED channel 2
3	green LED channel 3
4	green LED channel 4
5	SDI input channel 1
6	SDI input channel 2
7	SDI input channel 3
8	SDI input channel 4
9	<i>not used</i>

Figure 3-30
connectors of the QUAD SDI VIDEO CARD

Order

For the order in that the input cards are inserted into TRANSFORM A, please see section [3.2.7 Quad Analog Video Card](#).

Specifications

For detailed technical specifications of the QUAD SDI VIDEO CARD please refer to section [7.1 Technical data](#).

3.2.10 Dual DVI Input Card

The DUAL DVI INPUT CARD provides the capability of displaying video or RGB signals provided as digital or analog data. Either two signals up to 165 MHz pixel clock (e.g. 1920×1080@60Hz) or one signal up to 330 MHz pixel clock (e.g. 2048×2048@60Hz) can be captured for further processing in TRANSFORM A.

Standard

The input formats SDTV analog, HDTV analog and digital, and RGB analog and digital (DVI-D) are supported.

Connectors

The DUAL DVI INPUT CARD has two DVI-I connectors. Each is for connecting one input signal to TRANSFORM A. The upper one, **In 1**, is a dual link DVI-I connector, which must be used, if a high-resolution signal is applied that uses dual link. **In 1** is also the connector that is used to connect a signal in single input mode.



1	input channel 1 DVI-I dual link
2	input channel 2 DVI-I

Figure 3-31
connector of DUAL DVI INPUT CARD

Adapter cables

For the connection of the variety of supported source signal types to the DVI-I connectors of the card a range of dedicated cables and adapters is optionally available.

Digital signals:	
DVI-D single link	copper or optical DVI-D <=> DVI-D cable, see section 7.3 Order codes
DVI-D dual link	suitable copper or optical DVI-D dual link cable, in doubt contact the customer support: 8.3 Hot line . The cable must be connected to In 1 .
HDMI single link	HDMI to DVI-D adapter, see section 7.3 Order codes
Analog signals:	
HD15 connectors	HD15 -> DVI-A adapter, see section 7.3 Order codes . Two adapters are in the scope of delivery
RCA connectors	3×RCA to DVI-A adapter cable, see section 7.3 Order codes and for connection below
BNC connectors	5×BNC to DVI-A adapter, see section 7.3 Order codes and for connection below

Table 3-3
Adapters and cables for DUAL DVI INPUT CARD

The connection of analog signals is according to the table below:

Color of wire	RGB	Composite Y	S-Video YC	Component YPrPb
red	R	Y	Y	Pr
green	G	–	–	Y
blue	B	–	C	Pb
black (only on BNC adapter cable)	V-SYNC	–	–	–
gray (only on BNC adapter cable)	H-SYNC	–	–	–

Table 3-4
Connection of analog signals to DUAL DVI INPUT CARD

Order

Within a single DUAL DVI INPUT CARD the numbering of the video channels is as shown in the figure above. For the order in that the input cards are inserted into TRANSFORM A, please see section [3.2.7 Quad Analog Video Card](#).

Specifications

For detailed technical specifications of the DUAL DVI INPUT CARD please refer to section [7.1 Technical data](#).

3.2.11 Dual RGB Input Card

The DUAL RGB INPUT CARD provides the capability of displaying RGB monitor signals. Two analog signals up to 1280×1024@75Hz are digitized for further processing in TRANSFORM A.

Standard

The synchronization modes **Hsync+Vsync**, **Csync** and **Sync-on-Green** are supported.

Connectors

The DUAL RGB INPUT CARD has two VGA compatible 15-pin SubMiniD connectors. Each is for connecting one RGB signal to TRANSFORM A.

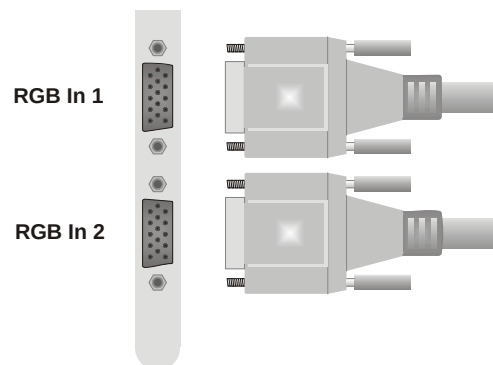


Figure 3-32
connector of DUAL RGB INPUT CARD

Order

Within a single DUAL RGB INPUT CARD the numbering of the video channels is as shown in the figure above. For the order in that the input cards are inserted into TRANSFORM A, please see section [3.2.7 Quad Analog Video Card](#).

Specifications

For detailed technical specifications of the DUAL RGB INPUT CARD please refer to section [7.1 Technical data](#).

3.2.12 Multiport I/O card

The Multiport I/O Card extends the system with additional serial connectors. They may be helpful for controlling multiple devices through the control room management software OSIRIS.

Connectors

The Multiport I/O Card has two serial sockets.



- | | |
|---|-----------------|
| 1 | 1st serial port |
| 2 | 2nd serial port |

Figure 3-33
Multiport I/O Card

Order

The Multiport I/O Card is inserted in an PCI slot of the PROCESSOR. Up to three Multiport I/O Cards can be used in a PROCESSOR.



Inserting a Multiport I/O Card in an OmniBus or Extender is not supported!

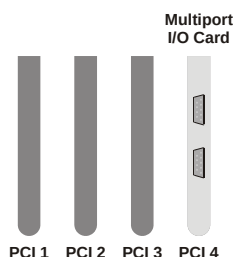


Figure 3-34
Position of Multiport I/O Card in an PROCESSOR AGS-3389

3.2.13 Network

Network adapters

With TRANSFORM A the following network adapters are available: The onboard LAN adapters on the mainboard, the Ethernet Card 100 Mbps as well as the Ethernet Card 1000 Mbps. These adapters are used to connect the PROCESSOR to the LAN (local area network) and to connect central device and rendering machines to the sub-net.

The sub-net connection is established via a Gigabit Ethernet Switch, see section [3.2.14 Distributed system](#).

Redundant network connection

For a redundant connection to the LAN the Ethernet Card 100 Mbps as well as the Ethernet Card 1000 Mbps are also available as server adapters, allowing to configure them in teaming mode, sharing one single IP-address. On the label on the card is indicated whether a network card is of server or desktop type. The onboard LAN adapters of the PROCESSOR **AGS-3390-2** can also be used to configure teaming mode. Please refer also to section [6.1.7 Redundant network adapter](#) for more information.

PCI and PCI Express network adapters

The Ethernet Card 100 Mbps is available only as PCI card; the Ethernet Card 1000 Mbps is available as PCI card and as PCI Express card.

Models

The various models of network adapters allow different usage. The following table gives an overview about this possible usage:

	connection speed [Mbps]	redundant network connection	usage for following connections:			
			PROCESSOR or central device – LAN connection	central device – subnet connection	rendering machine – subnet using PXE	rendering machine – subnet using Etherboot
Onboard LAN adapter	10/100/1000	not OK	OK	not OK	OK	not OK
Onboard LAN adapter AGS-3390-2	10/100/1000	OK	OK	OK	OK	not OK
Ethernet card 100 Mbps, desktop, PCI	10/100	not OK	OK	OK	OK	OK *
Ethernet card 1000 Mbps, desktop, PCI	10/100/1000	not OK	OK	OK	OK	not OK
Ethernet card 1000 Mbps, desktop, PCIe	10/100/1000	not OK	OK	OK	OK	not OK
Ethernet card 100 Mbps, server, PCI	10/100	OK	OK	OK	OK	OK *
Ethernet card 1000 Mbps, server, PCI	10/100/1000	OK	OK	OK	OK	not OK
Ethernet card 1000 Mbps, server, PCIe	10/100/1000	OK	OK	OK	OK	not OK

*) version containing Etherboot code



In a distributed system the rendering machines are booted via the sub-net by means of packets sent by the central device. Therefore the network adapter in the rendering machines must be capable to boot via a network. For the TRANSFORM A system there exist two different possibilities to achieve this. It depends on the hardware that is used in your TRANSFORM A system, which one of these two methods is used.

Former systems used special rendering Ethernet cards that carried Etherboot code which requested the needed boot packets as soon as the central device had booted. With PROCESSOR models **AGS-3328-2** and from X server release 3.48 on, no special rendering Ethernet cards are needed any longer (anyhow the usage of these cards remains supported). Instead PXE (the Pre-eXecution Environment) is used. For reliable function of this mechanism it is necessary that wake on LAN (WOL) is configured in the server configuration (see section [3.4.3 Configuring a distributed system](#)) and that WOL is also enabled in the BIOS of the mainboard of the respective rendering machines (see section [6.1.11 BIOS settings for rendering machines](#))

Connectors

The onboard LAN adapter, the 100 Mbps and the 1000 Mbps network card each offer a Twisted Pair connection:

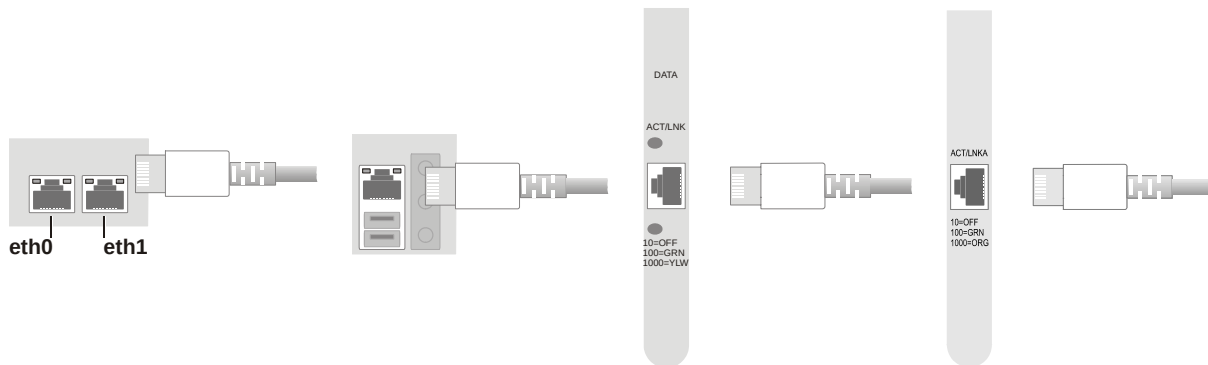


Figure 3-35
Connecting to Twisted Pair (RJ-45):
Onboard LAN adapters on AGS-3390-2 (left), Onboard LAN adapter on AGS-3389 and AGS-3328-2/-3 (middle left),
1000 Mbps Ethernet Card, PCI (middle right) and 1000 Mbps Ethernet Card, PCIe (right)

Order

The PCI Express network card is inserted in the first PCIe x1 slot. A second PCI Express network card can be inserted into the PCIe x16 slot.

The PCI network cards are inserted into the PCI slot of the PROCESSOR with the highest number. If several network cards are used, they are inserted in PCI slots with consecutive numbers. In general they are numbered in ascending order for descending PCI slot numbers.

For the onboard LAN adapters of **AGS-3390-2**, the left one is **eth0** and the right one **eth1**, if no other network adapters are used in the system.

If network cards and onboard LAN adapters are used commonly in a system, the network reporting utility can be used to figure out the order of the network adapters of the system; please refer to section [4.8.7 Network reporting utility \(procfg\)](#).

The system uses by default **eth0** to connect to the LAN.

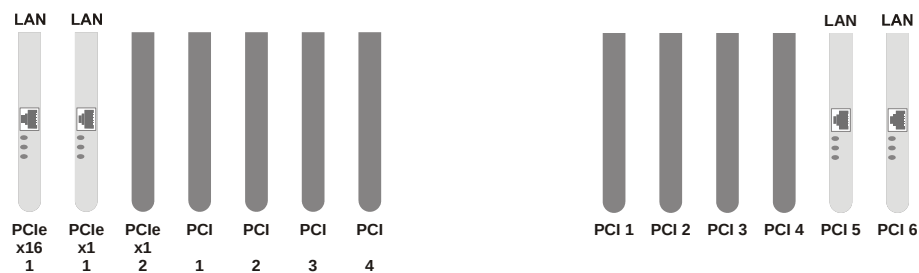


Figure 3-36
Network card in the PROCESSOR AGS-3389 (left) and PROCESSOR AGS-3328 (right)



Inserting a network card in an OmniBus or Extender is not supported!

3.2.14 Distributed system

With the distributed system multiple rendering machines are used.

In an OmniBus configuration one rendering machine consists of one rendering PROCESSOR and one or two OMNIBUS devices. Only one of the two OmniBus devices may contain graphics cards. OMNISCALERS and input cards may be used in both OMNIBUS devices.

In a Processor configuration one rendering machine consists just in one rendering PROCESSOR.

Each rendering PROCESSOR is connected to the central device by means of the TRANSFORM A sub-net.

With the distributed system, each rendering machine operates a rectangular array of projection modules within a display wall. The actual subdivision into arrays depends on the requirements of each display wall (e. g. displaying video). The following figure shows an example for a 10×5 arrangement:

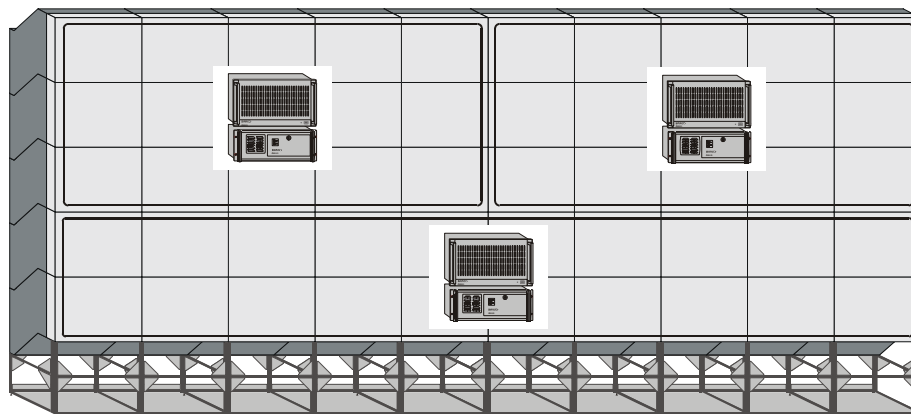


Figure 3-37
Example for the assignment of rendering machines to projection modules



Additional information about the assignment of rendering machines to projection modules can be found in section 6.1.6 Advanced configuration of TransForm A.

The rendering machines are connected to the central PROCESSOR within a separate sub-net (see also section 3.2.13 Network). Therefore a second network adapter has to be used in the central PROCESSOR, e.g. the second onboard LAN adapter of the PROCESSOR AGS-3390-2 or for other PROCESSOR types an additional network card.

For the LAN connection always the network interface **eth0** is used and for the sub-net connection always **eth1** is used.

In doubt the network reporting utility can be used to figure out the order of the network adapters; please refer to section 4.8.7 Network reporting utility (procfg).

To connect the rendering PROCESSORS to the sub-net also the network interface **eth0** is used. The onboard LAN adapter can be used for this purpose.

Sub-net

The Sub-net is established via a Gigabit Ethernet Switch. The Gigabit Ethernet Switch connects the rendering machines and the central device. Up to 7 rendering machines and the central device can be connected with one Gigabit Ethernet Switch.

3.2.15 CPU board

The CPU board controls amongst other the remote power on/off mechanism between the OMniBus devices and its host and the transmission of a genlock signal. It is part of each OMniBus.

Connectors

On the CPU board there are two RJ-45 connectors for connecting the remote power on/off cables.



Do not remove the sheet metal plate. The connector behind is reserved for diagnostic purposes.

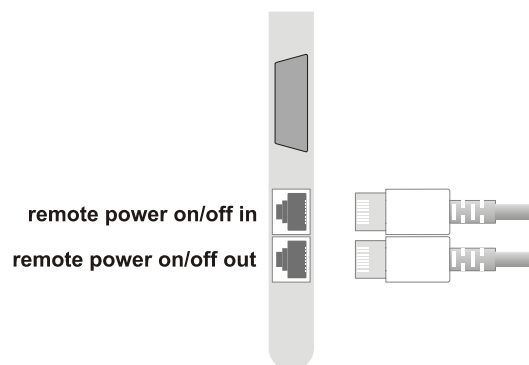


Figure 3-38
connectors of CPU board

Connecting order remote power on/off

Each OMniBus should be connected to its host for the remote power on/off mechanism. Therefore the **remote power on/off** connector [16] on the back of the host (PROCESSOR in a monolithic system, rendering PROCESSOR in a distributed system) must be connected with the **remote power on/off in** connector of the CPU board of the OMniBus. Multiple OMniBus devices are connected in a daisy chain to their host by connecting the **remote power on/off out** connector of the first OMniBus to the **remote power on/off in** connector of the next OMniBus and so on. The **remote power on/off out** connector of the last OMniBus remains unconnected.

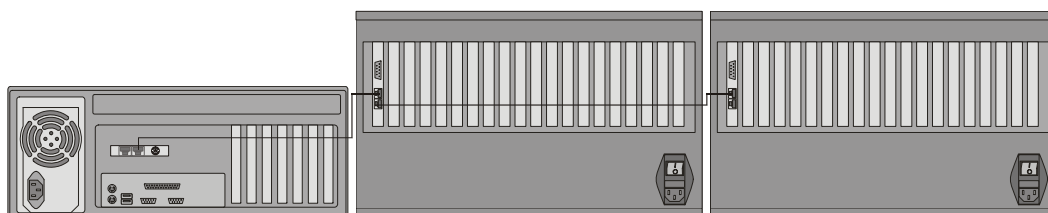


Figure 3-39
cabling for remote power on/off at OMniBus A18 devices



Do not mix up the connectors for remote power on/off with the mechanically identical connectors of the network adapters!

Mixing the connectors will cause damage to the system.

Connecting order remote power on/off and genlock

In general all OMNiBus devices that are locked to the same source must be connected to each other by means of the **remote power on/off** cabling.

Therefore in a distributed system an additional connection is necessary; the **remote power on/off** connector [16] on the back of the central PROCESSOR must be connected with **external genlock loop through in** connector [15] on the back of the first rendering PROCESSOR. The **remote power on/off out** connector of the last OMNiBus of a rendering machine must be connected to the **external genlock loop through in** connector [15] on the back of the next rendering PROCESSOR.

If multiple TRANSFORM A systems shall be locked to the same source, the **remote power on/off out** connector of the last OMNiBus must be connected to the **external genlock loop through in** connector [15] on the back of the central PROCESSOR of the next TRANSFORM A system.

If an external source is used for genlocking it must be connected to the **external genlock in** connector [17] on the back of the PROCESSOR.

An example of cabling for an external genlock source is given in the figure below:

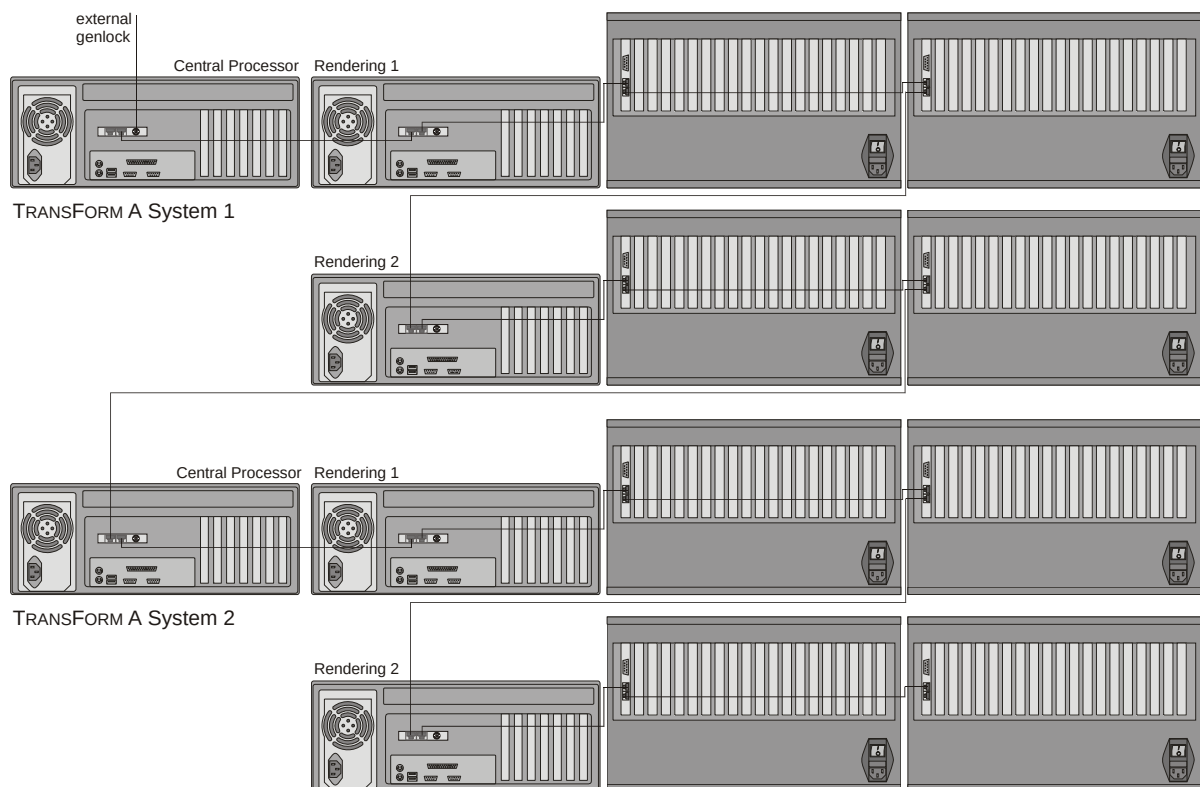


Figure 3-40
cabling for remote power on/off and external genlock at OMNiBus A18 devices

3.2.16 OmniBus

Connecting to the host

The data connection between PROCESSOR and OMNIBUS is established with a link interface cable. It connects the respective link interface card in the PROCESSOR [19-24] (Figure 3-5) with the link interface card in the OMNIBUS A12 [9] (Figure 3-8) and in the OmniBus A18 [6] (Figure 3-11) respectively with a round cable.



Figure 3-41
round cable for connection of host and OMNIBUS



The cable between host and OmniBus is fragile. It may not last under tension, or being bent or twisted.

Connecting several OmniBus devices

In the PROCESSOR AGS-3389 there are four PCI slots for link interface cards available. With AGS-3328 five link interface cards can be used. The respective number of OMNIBUS devices can be connected to one PROCESSOR. Each OMNIBUS is connected in the manner explained above.

Order

The link interface cards are inserted in the PCI slots of the PROCESSOR following the network cards in the slots with the lower numbers. If more than one OMNIBUS is connected, they are numbered in the sequence of the PCI slots.

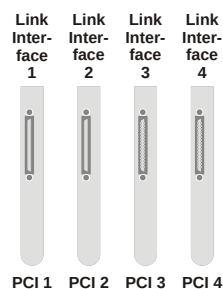


Figure 3-42
Link interface cards in host to connect to multiple OMNIBUS devices



The Processor expects the primary graphic adapter in the first OmniBus. Therefore the OmniBus that is connected to the link interface 1 must be equipped with graphic cards.

Order of graphic and input cards

The graphic cards are numbered consecutively with ascending PCI slots. Each OMNISCALER is numbered according to the graphic card it is connected to. The QUAD ANALOG VIDEO CARDS, STREAMING VIDEO CARDS, QUAD SDI VIDEO CARD, DUAL DVI INPUT CARD and DUAL RGB INPUT CARDS are numbered commonly with ascending PCI slots. The OMNiBus devices themselves are taken into account in ascending order of their respective PCI slots in the PROCESSOR or in a distributed system in the order of the rendering machines.

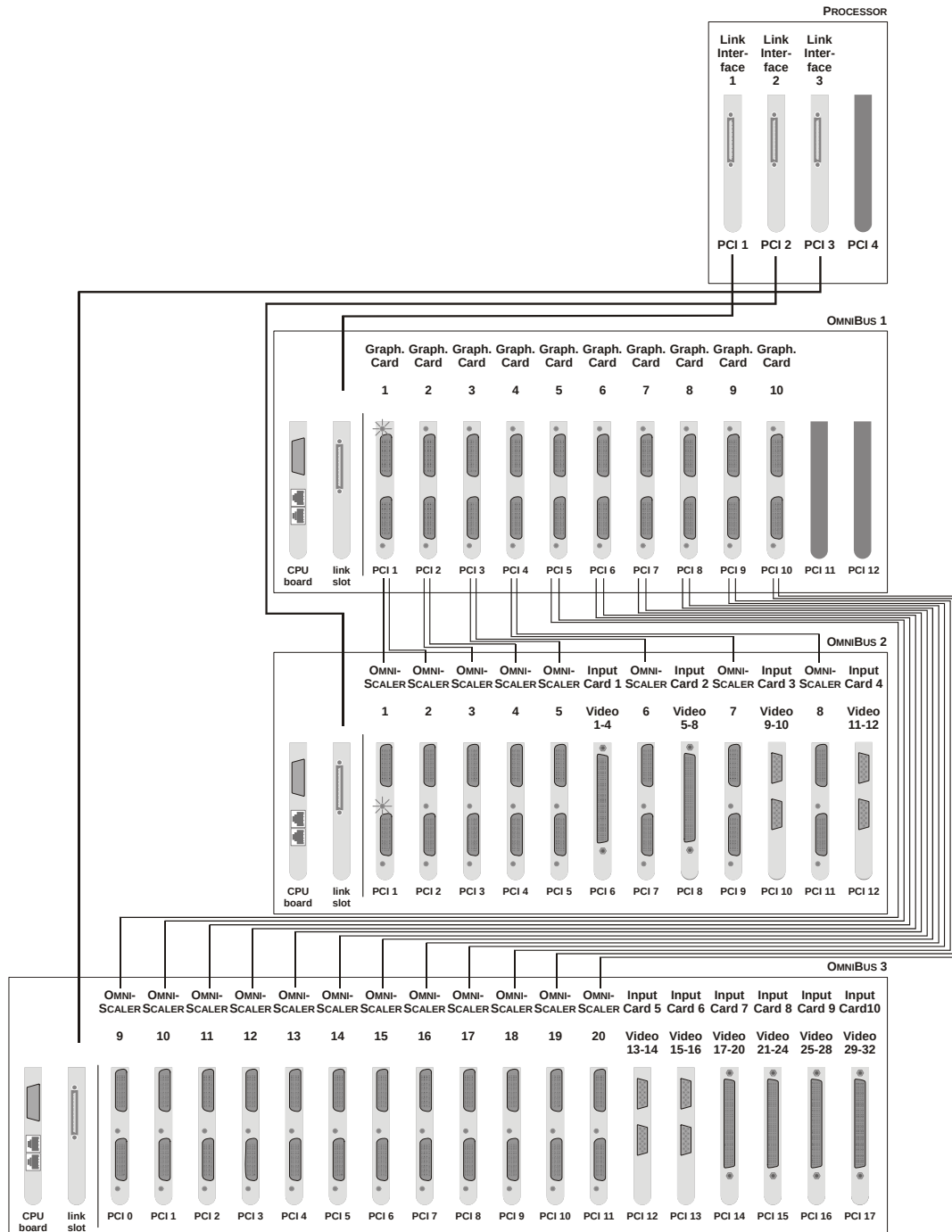


Figure 3-43
Example for the numbering in a configuration with three OMNiBus devices of a monolithic system

3.2.17 Extender

Connecting to the Processor

The data connection between PROCESSOR and EXTENDER is established with a link interface card in the PROCESSOR and in the EXTENDER, which are connected with a round cable.

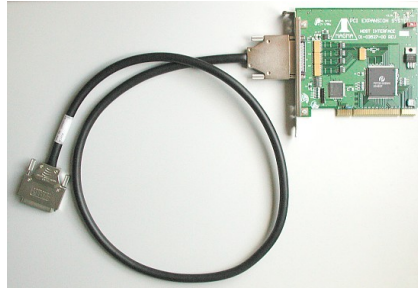


Figure 3-44
Round cable to connect PROCESSOR and EXTENDER



The cable between Processor and Extender is fragile. It may not last under tension, or being bent or twisted.

The link interface cards consume one PCI slot in the PROCESSOR and in the EXTENDER.

Order

The connection card is inserted in the PCI slot with the lowest numbers.

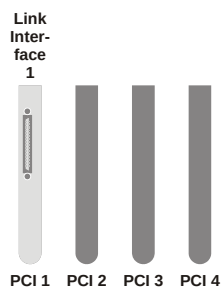


Figure 3-45
Connection card to the EXTENDER

Order of graphic and input cards

In a configuration with an EXTENDER the numbering of the graphic cards and QUAD ANALOG VIDEO CARDS, STREAMING VIDEO CARDS, QUAD SDI VIDEO CARDS, DUAL DVI INPUT CARD and DUAL RGB INPUT CARDS follows the order implicitly given by the EXTENDER and its interconnection. The OMNISCALERS are numbered according to the graphic cards they are connected to.

Numbering begins at slot **PCI 1** of the PROCESSOR. As soon as an EXTENDER is connected, numbering continues with the PCI slots of this EXTENDER. After that the remaining slots of the PROCESSOR are numbered. The numbering is illustrated in the figure below.

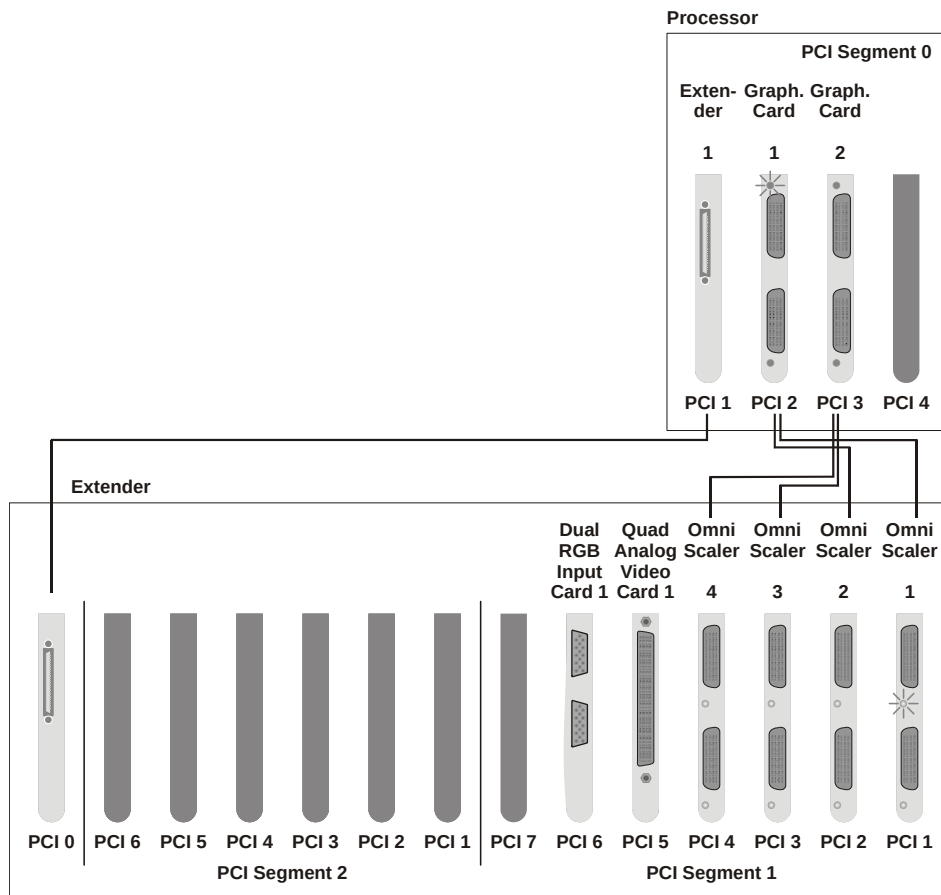


Figure 3-46
Example for the numbering in a configuration with an EXTENDER

3.2.18 Example configurations

The examples below cover different kind of configurations to show the different possibilities of setups and connections. The following abbreviations are used:

- **G:** graphic card
- **O:** OMNISCALER
- **I:** input card, i.e. QUAD ANALOG VIDEO CARD, DUAL DVI INPUT CARD, DUAL RGB INPUT CARD, QUAD SDI VIDEO CARD or STREAMING VIDEO CARD

The schematic drawings of the TRANSFORM A devices show always the view on the back of a device. To keep it clearly arranged only the available PCI slots are plotted. The display wall is shown from the front!

Small monolithic system in Processor configuration

Below a sketch of a four-channel system with digital output and 4 freely movable and scalable video windows in a Processor configuration in a monolithic system:

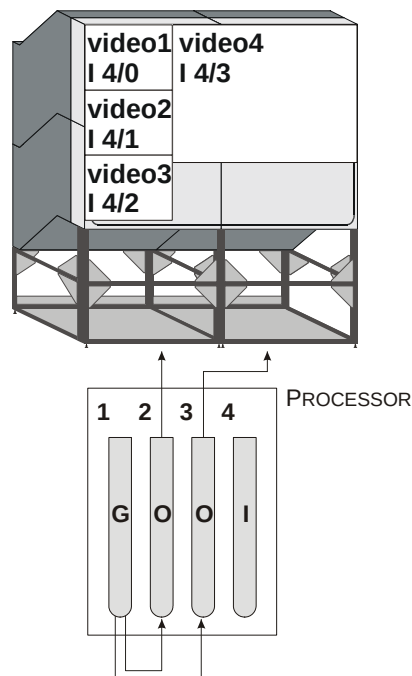


Figure 3-47
small system in Processor configuration

In our example all cards can be inserted into one PROCESSOR. A TRANSFORM A in Processor configuration is sufficient to control the wall.

Small monolithic system in OmniBus configuration

A system consisting of one PROCESSOR and one OMNIBUS A12 is the smallest possible system of an OmniBus configuration. Already this setup allows a system of 44 channels, if purely graphics data is displayed. On the other hand up to 40 videos can be displayed on a wall consisting of two channels. Lots of intermediate configurations are also possible. In this example there is a configuration shown, where the number of output channels and video sources is more balanced in an eight channel system with 24 freely movable video windows:

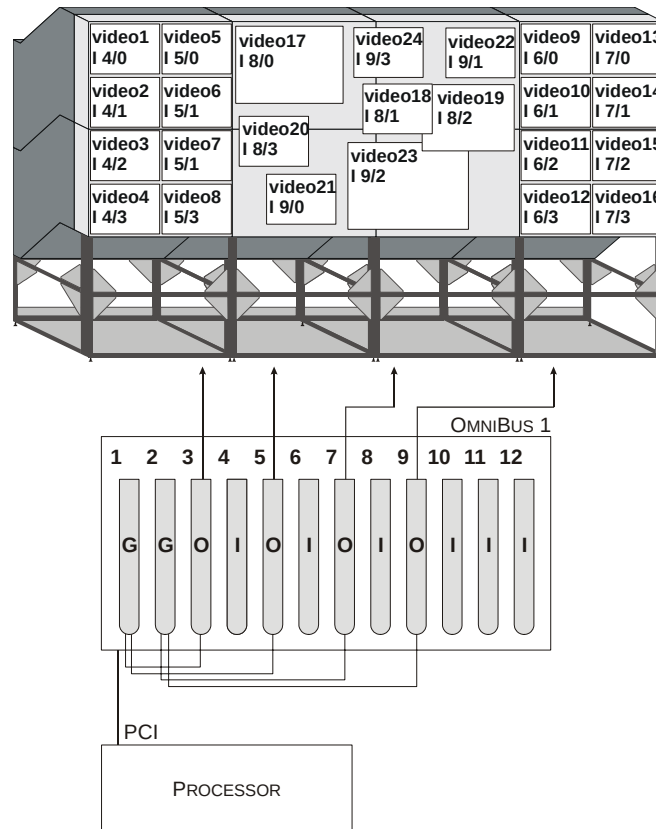


Figure 3-48
small system in OmniBus configuration

Medium monolithic system

An example for a configuration for a system with digital output, 24 channels and 20 freely movable video windows can be seen in the figure below:

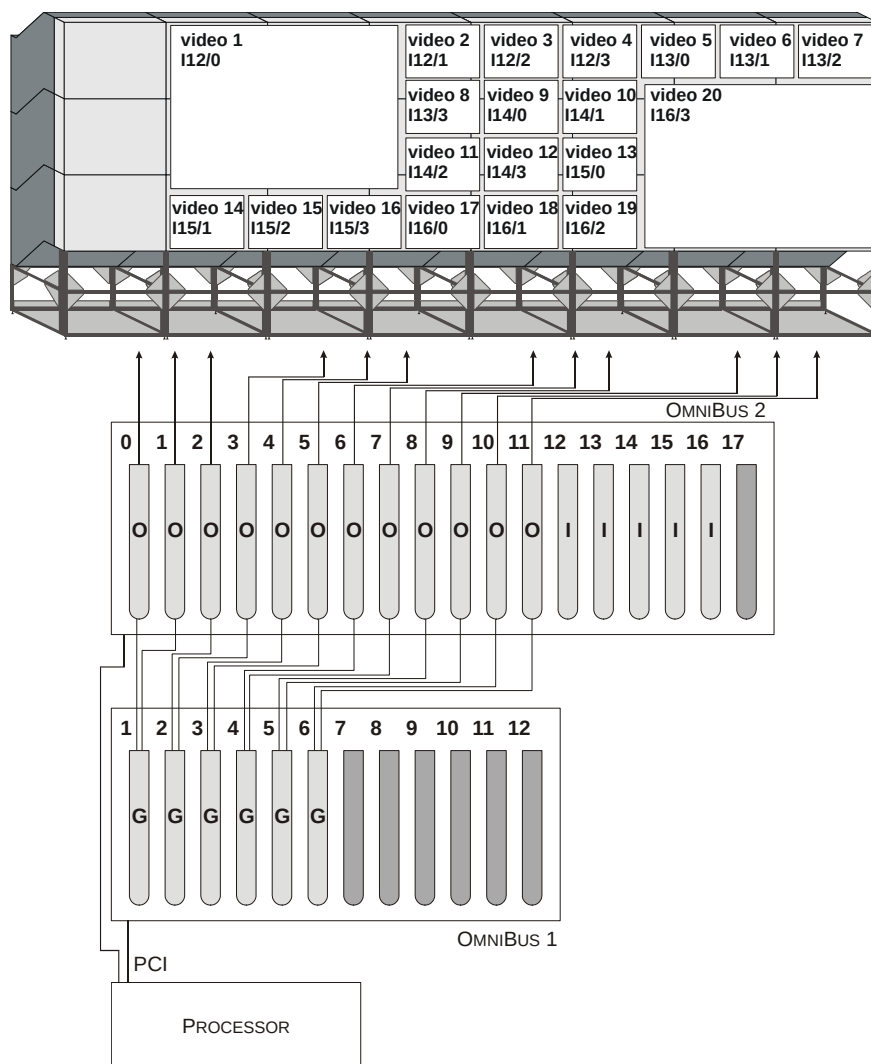


Figure 3-49
medium monolithic system

The system is realized with a monolithic system. Here it is advantageous to use one OMNIBUS for the graphic cards, the other for OMNISCALERS and input cards and therefore for the output to the display wall. Because all input cards and OMNISCALERS fit in the same OMNIBUS, all video windows are freely movable on the whole display wall.

Large monolithic system

The following system has 54 channels, digital output and 60 video windows that are movable and scalable within their respective display area. To get video windows that are freely movable on the whole display wall a distributed system would be required instead.

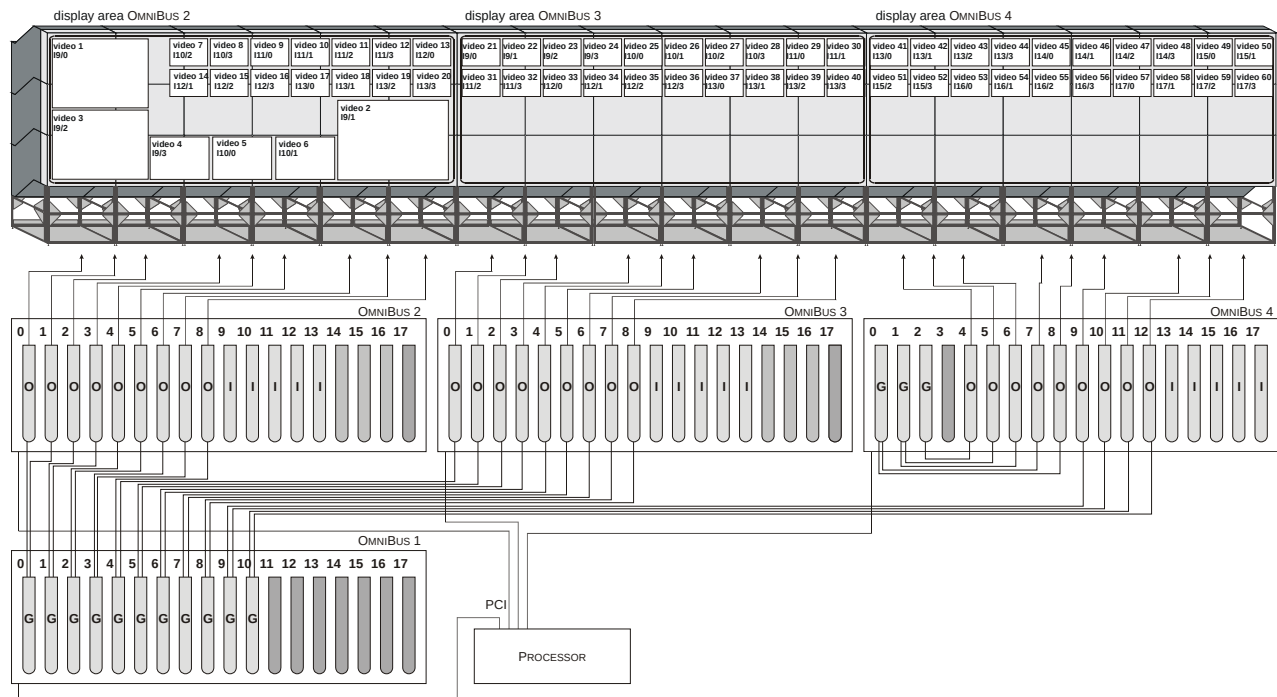


Figure 3-50
large monolithic system configuration

One PROCESSOR that connects to four OMniBus devices controls the wall. OMniBus 1 is solely filled with graphic cards and does therefore not directly provide data for the wall. OMniBus 2, 3 and 4 contain the OMniSCALERS and input cards (and some further graphic cards) and provide the final display data for the projection modules. The video output of each OMniBus can be displayed on its respective display area but can not be moved into another display area.

Large distributed system

The following system has 72 channels, digital output and a configuration that enables either 20 freely movable video windows or 60 video windows that are movable and scalable within their respective display area. Here four freely movable windows and 48 windows that are limited to their display area are shown.

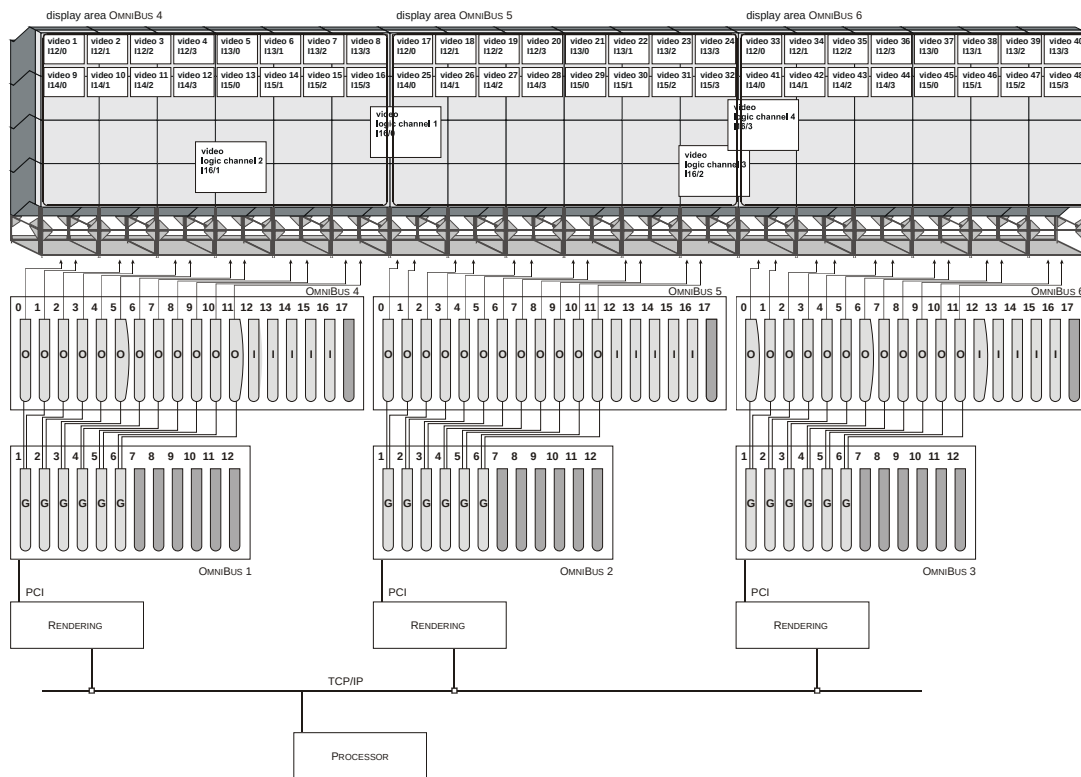


Figure 3-51
large distributed system configuration

Three rendering machines are used each consisting out of two OMNIBUS devices (one for graphic cards and one for OMNISCALE and input cards) and one rendering processor that connects to the subnet. On the wall there are three logical display areas, each belongs to one rendering machine.

There are different possibilities to display the video windows. On the one hand a video can be displayed using multiple input channels one from each rendering machine to form one logical video channel. Such a video window can be displayed freely movable and scalable on the whole wall regardless of the different display areas. In our example 20 such video channels could be built.

On the other hand, 60 videos could be displayed, each 20 restricted to one display area but within these boundaries freely movable and scalable.

Also combinations between these both ways to display video are possible. In the example above each rendering machine provides 16 videos that are restricted to their display area (input card 12, 13, 14 and 15) and together they are able to display 4 further videos movable over the whole display wall (input card 16). Please refer also to section [4.6.2 The video channels](#).

To build larger display walls, simply connect further rendering machines to the sub-net. By this virtually unlimited display walls can be set up, all being configured in the way explained in the example above.

System with digital output and partial video

Below is an example of a system with 36 channels and digital output. Only a limited number of projection modules need to display video.

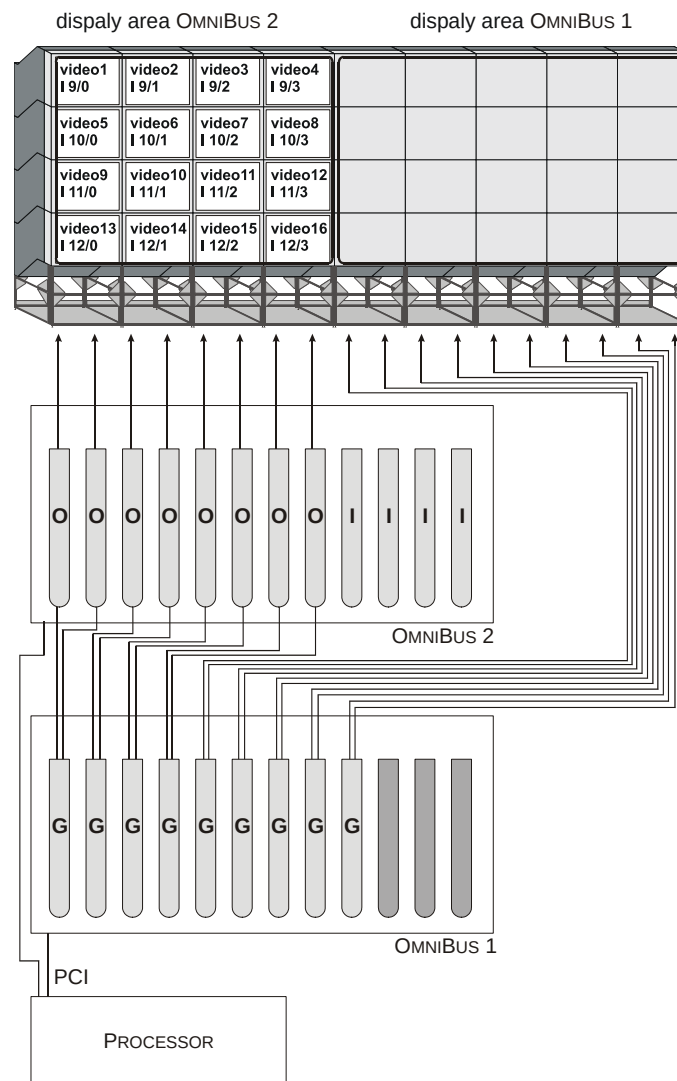


Figure 3-52
system configuration with digital output and partial usage of OMNISCALERS

Therefore two OMNiBus devices in a monolithic system are used. OMNiBus 1 is used for graphic cards. The output of the graphic cards 4-8 is directly displayed on the projection modules on the right side of the display wall (display area OMNiBus 1). The output of the graphic cards 0-3 is provided to the OMNISCALERS in the OMNiBus 2 for video integration. The output of the OMNISCALERS is displayed on the left part of the display wall (display area OMNiBus 2). On this area 16 video windows can be displayed and freely scaled and moved. If a video window is moved to the display of OMNiBus 1, the window appears with the background color.

3.3 Starting up

3.3.1 Connecting

Mouse and keyboard must be connected to the respective sockets on the rear of the PROCESSOR respectively the central PROCESSOR. Please, refer to sections [3.2.2 Mouse](#) and [3.2.3 Keyboard](#)!

- **In an OmniBus configuration** connect the link interface and remote power on/off cables to the TRANSFORM A devices. If an external genlock signal is used, connect it also to the PROCESSOR. Please refer to [3.2.16 OmniBus](#) and [3.2.15 CPU board](#)!
- **In a Processor configuration**, if necessary, connect the EXTENDERS to the PROCESSOR. Please, refer to [3.2.17 Extender](#)!

You have to provide the appropriate power supply. Plug in the power cables on the back panel of the TRANSFORM A devices. Please, refer to section [3.2.1 Power supply](#)!

Connect the graphic cards to the OMNISCALERS, if OMNISCALERS are used. Connect the display devices to the graphic cards or OMNISCALERS. At least one display must be connected for administrating TRANSFORM A. Please, refer to [3.2.5 Graphic cards](#) and [3.2.6 OmniScaler](#). Connect the video and RGB sources to the video-input cards of TRANSFORM A. Please, refer to section [3.2.7 Quad Analog Video Card](#), [3.2.8 Streaming Video Card](#), [3.2.9 Quad SDI Video Card](#), [3.2.10 Dual DVI Input Card](#) and [3.2.11 Dual RGB Input Card](#)!

Connect the PROCESSOR to the local area network by connecting the network to the network card or the network onboard adapter! Please, refer to section [3.2.13 Network](#)!



For configuring a distributed system, the central device must be connected to a monitor. Refer to section [3.2.5 Graphic cards](#), please! Connect the rendering machines with the central processor and the OMNIbus devices with the rendering processors. Refer to section [3.2.14 Distributed system](#), please!

3.3.2 Switching on

- **In an OmniBus configuration:**

Using OMNIbus A18 first make sure that the power switches [26] ([Figure 3-11](#)) of all connected OMNIbus A18 devices are on. The **LED operating status** [3] ([Figure 3-10](#)) on each OMNIbus A18 should show a red light. Check also that the power switches [35] ([Figure 3-5](#)) on the rear of the PROCESSOR (if available) are switched on.

Using OMNIbus A12 just make sure that the **red LED standby / component failed** [6] ([Figure 3-7](#)) is permanently on, indicating Standby mode.

Then switch on the PROCESSOR by pressing the **power button** [13] ([Figure 3-1](#)) on its front! By means of the remote power on/off mechanism all TRANSFORM A devices are now centrally switched on and initialized in the necessary order. The LED operating status of the OMNIbus A18 should show a green light and the LED power on [4] on the OMNIbus A12 should be lighting.

- **In a Processor configuration**, switch on the PROCESSOR by pressing the **power button** [13] ([Figure 3-1](#)) on the front! If also an EXTENDER is used switch it on first by pressing the On/Off-switch [3] ([Figure 3-13](#)).



The order in which the central Processor and the rendering Processors are switched on is of no importance.

After switching on the PROCESSOR boot information is displayed on the graphic device connected to port 0 of the first graphic card.



When switching on the central Processor of a distributed system this text is displayed on the connected monitor.

The other displays show their respective bus and slot no., e. g.:

PCI Bus: 2, PORT: 1

There are two possible boot modes for TRANSFORM A. Normal boot mode and eXtended safety boot mode. See section [6.1.1 Boot modes](#). The operation of TRANSFORM A differs a little, depending on this mode.

Normal boot mode

After a few minutes the graphical user interface X.11 appears without user interaction.

eXtended safety boot mode

The TRANSFORM A startup screen comes up. Select **linux** to boot from the working partition.



If you select backup, the restore procedure is started and the working partition becomes overwritten with the backup system, which may lead to a loss of current data, depending on the state of the backup, please see section [4.8.5 Backup and restore procedures \(eosxs Utility\)](#)!



Figure 3-53
TRANSFORM A startup screen

After a few minutes the graphical user interface X.11 appears.

Configuration

If software configuration has already been carried out you can go on with chapter [4 Operating](#). Otherwise proceed configuring TRANSFORM A in section [3.4 Configuration software](#).

3.3.3 Switching off

To switch off TRANSFORM A save your work, remove any disk or CD from the drives and exit from any application. Terminate the X-Server, log on as root and enter **shutdown -h now** for shutting down or **shutdown -r now** for rebooting.

```
eos:/root # shutdown -h now
```

When TRANSFORM A has shut down it switches off automatically.



To avoid any complications, it is recommended to switch off TransForm A in the way explained above!



The order in which you switch off central processor and rendering machines is insignificant.



If TransForm A is switched off as explained above, not all parts are disconnected from the power supply. To disconnect the whole device the power switches of all OmniBus devices, Extender and Processor must be switched off and all power plugs of the devices have to be pulled out after switching off.

3.4 Configuration software

TRANSFORM A comes to you with installed and pre-configured software. Nevertheless before you put TRANSFORM A into operation, you have to run through a system configuration to insert the properties of your network like the IP address and the keyboard type. Furthermore an X.11 configuration is needed to adjust TRANSFORM A to your local conditions.

3.4.1 System configuration

The following section describes how to change or insert the network configuration, keyboard properties, user properties or passwords.

To change the configuration log in as **root** and start the configuration utility. The factory set password for root is **barco**:

```
eos login: root
Password: barco
```

Enter **linuxconf**.

```
eos:/root # linuxconf
```

Navigate within the configuration window by using the **Tab** key and the **arrow** keys. A **+** in front of a folder signifies the folder is open, a **-** signifies the folder is closed. Select the folder by putting the focus on it (**Arrow up** key and **Arrow down** key) and confirming with the **Enter** key to change it's state. An arrow after a word signals that there is a list hidden. Open the list by putting the focus on the word and pressing **<Ctrl> X**. Put the focus on a list item to select it and confirm.

There are also help files available. Each window contains a **Help** button. The **Help** button of the main window offers general help. The **Help** buttons of the sub windows offer help, concerning the content of the sub window.

Network configuration

Select **Config : Networking : Client Tasks : Host name and IP network devices**.

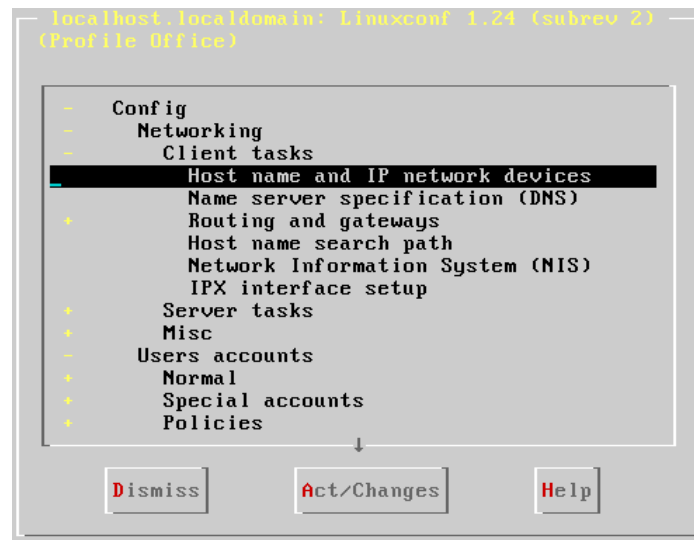


Figure 3-54

Up to four network cards are automatically detected during the system installation. This means the settings for net device and kernel module are correct if the cards have been present during installation. If a card is inserted afterwards also these settings have to be adopted. The drivers (Setting: **Kernel module**) for the different network cards are:

driver	network card	redundancy
eeepro100	Ethernetcard 100 Mbps, PCI	no
e100	Ethernetcard 100 Mbps, PCI	possible
e1000	Ethernetcard 1000 Mbps, PCI	possible
e1000	onboard LAN adapter (AGS-3328-2 and higher)	no
e1000	onboard LAN adapter (AGS-3390-2)	possible
bcm4400	onboard LAN adapter (AGS-3328-1 and lower)	no
bcm5700	onboard LAN adapter (AGS-3389)	no

For the configuration of a redundant network please refer to section [6.1.7 Redundant network adapter](#).

The section **Adaptor 1** treats the network options of the LAN connection of TRANSFORM A. You can change them by selecting and editing them. If you are putting TRANSFORM A into operation you have to change the pre-adjusted IP address to your own.

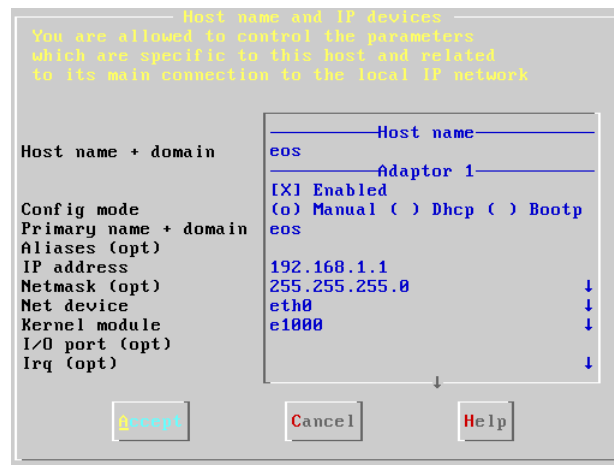


Figure 3-55



Take care to insert the same sub net IP address in the configuration for a distributed system as explained in section 3.4.3 Configuring a distributed system.

The section Adaptor 2 treats the network options of the subnet, used with the distributed system.

For the sub-net network card of the central unit, IP addresses must be specified.

Use the IP addresses **192.168.60.xxx** as long as it will not collide with any other subnet within the Internet. Select **192.168.60.254** for the central processor. This enables the numbering of the rendering machines consequently with **1, 2, 3**, etc. Clarify the corresponding Netmask addresses with your network administrator. In the field **Primary name + domain** insert **eos-core**.

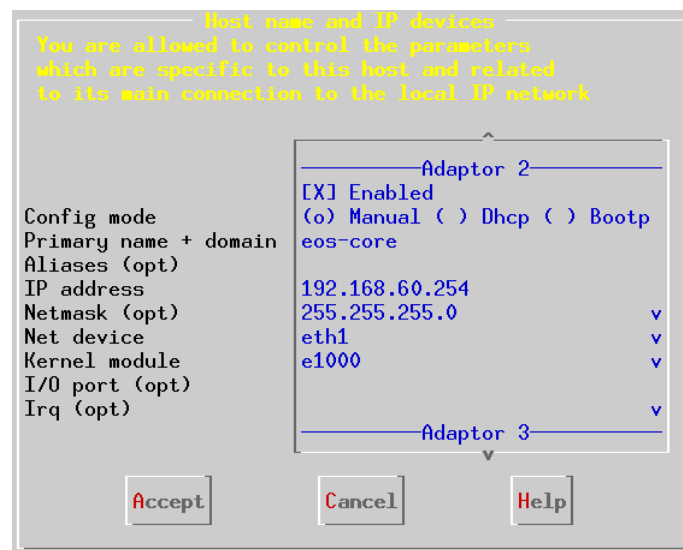


Figure 3-56

Confirm your changes with **Accept** or leave with **Cancel**.

Keyboard

Select **Control : Features**. The Features tab opens. Here is the keyboard map that provides the different keyboard types. You have also the possibility to choose the language in which the dialogs are held. Hit **Accept** when finished.

Time (optional)

If TRANSFORM A is just used as X-terminal, it does no date & time related processing.

Select **Control : Date&Time**. Adjust TRANSFORM A to your time and confirm with **Accept**.

User accounts (optional)

As TRANSFORM A comes preconfigured with user <mmt> and password <mmt> usually defining an additional user account is not required.

Select **Config : Users accounts : Normal : User accounts**. This will open the Users accounts tab.

If you have more than 15 accounts on the system, Linuxconf will provide you with a filter screen. You can use this to select a smaller range of accounts than the full list. To get the full list, select **Accept** without changing any of the parameters.

Select **Add**. This will open the **User account creation** tab.

The **User account creation** tab is where you enter all the information on the new account. It has a number of fields; only the login name is required, though filling in the **Full name** field is strongly recommended. Once you have entered the login name and any other desired information select the **Accept** button. If you decide against creating a new user, hit **Cancel** instead.

Upon hitting **Accept** the configuration program will prompt you to enter the password. There is also a field called **Confirmation** where you will need to type the password again. Passwords must be at least 6 characters in length. They may contain numbers as well as a mix of lowercase and uppercase letters. Hit **Accept** when finished.

Changing a user's password (optional)

Select **Config : Users accounts – Normal – User accounts**. This will open the **Users accounts** window. Select the account whose password you wish to change. This will open the **User information window**. Select **Passwd** from the options at the bottom of the screen.

The configuration software will then prompt you to enter the new password. There is also a field called **Confirmation** where you will need to type the password again. This is to prevent you from mistyping the password. Passwords must be at least 6 characters in length. They may contain numbers as well as a mix of lowercase and uppercase letters. If you decide against changing the password, just hit **Cancel**. Once you have entered the new password select **Accept**.



You have to reboot TransForm A to make changes become effective.

If you operate TransForm A in eXtended safety boot mode, please take care to update the backup partition after successful configuration, see section [4.8.5 Backup and restore procedures \(eosxs Utility\)](#).

3.4.2 X.11 configuration

For the X.11 configuration of TRANSFORM A the script call must be entered in line mode. Therefore leave X.11 for configuration purposes with the following keys pressed simultaneously:

<Ctrl> <Alt> <Backspace>

It takes several seconds until X.11 terminates completely. During that time the display wall is black. Then, back in line mode log in as **root**! The factory set password for root is **barco**:

```
eos login: root
Password: barco
```

Configuration can be carried out by means of the configuration script **EOSconfig**. To start this script, change the directory first:

```
eos:/root # cd /opt/MMT2686/config/
```

then execute the script:

```
eos:/opt/MMT2686/config # ./EOSconfig
```

EOSconfig will guide you through the configuration. You can exit configuration without saving the modifications at any time by pressing simultaneously:

<Ctrl> C

Thus all parameters entered up to now were deleted again. It is more convenient however to check all data necessary for configuration first and then start the script. Therefore you are recommended to read through the following pages of this section before starting the configuration.

Below you can read through a typical course of the configuration script expanded with comments giving more details.

```

*****
*
*      Argus X11Server Configuration      *
*      Release 4.3.0                     *
*      (c)2008  BARCO                    *
*
*      email : support.bcd@barco.com      *
*      Tel   : 0049-721-6201-0           *
*      Fax   : 0049-721-6201-298         *
*
*****

1  Argus Multi-Screen X11Server
2  Argus Distributed X11Server
3  Argus Multiple Logical Screens X11Server
4  Exit

```

```

Enter your X11Server Configuration [1]: 1
Customized Configuration (yes/no)? [no]: no

```

The value indicated in square brackets will be taken by simply pressing **<Return>**. This can be the default value if the configuration script is running the first time or the value entered during the last configuration.

The first question allows you to choose between the configuration of a monolithic TRANSFORM A [1], a distributed system [2] or an TRANSFORM A configuration with multiple logical screens [3]. Entering [4] exits the script.



Configuring a distributed system is largely similar to configuring a monolithic TRANSFORM A. In this section configuration of a monolithic TRANSFORM A is demonstrated, but this part is identical for both kind of configuration. See section 3.4.3 Configuring a distributed system for the additional parts.

The second question allows you to choose between a complete and a custom configuration, see section 6.1.4 [Custom configuration](#).

Mouse device

You can connect different types of mice. Please enter the type of mouse you want to use and specify its properties! If you use the standard USB mouse you must select:

- 8. PS/2 or USB Microsoft IntelliMouse and compatible Wheel Mice or
- 12. No Mouse with OSIRIS where TRANSFORM A is operated without local mouse.

```

Configuring the Monolithical X Server
=====

```

```

Settings for the Input Devices
=====

```

```

Please enter the required settings for
- Mouse
- Cursor size

```

```

Configuring the Mouse Device
-----

```

1. Microsoft Mouse and compatible 2-buttons Mice
2. Mouse Systems 3-buttons Mice
3. MM Series
4. Logitech Mouse (old type, Logitech protocol)
5. Logitech MouseMan (Microsoft compatible)
6. MM HitTablet
7. PS/2 or USB Microsoft Mouse and compatible Mice
8. PS/2 or USB Microsoft IntelliMouse and compatible Wheel Mice
9. PS/2 or USB Microsoft IntelliMouse Explorer
10. Bus Mouse
11. Unknown
12. No Mouse

```

Enter a protocol number [8]: 8

```

```

Do you have an USB mouse (yes/no)? [yes]: yes

```

X11 big mouse cursor

In particular for big display walls, it can be useful to enlarge the mouse pointer. Indicate the desired magnification factor:

```
Configuring the Big Mouse Cursor
-----
When using the X Server with high resolution
the standard cursors are hard to track for some people.
Therefore you can define magnified mouse cursors.
Following magnification factors are available:

factor 1      : standard cursors
factor 2..8   : magnified cursors
```

Enter the magnification factor [1]: 2

```
These are your Input Device settings
=====
- Cursor size:                Factor 2
- Mouse Protocol:             ImPS/2
- Mouse Device:               USB: "/dev/input/mice"
Everything correct? (yes/no)? [yes]: yes
```

```
Settings for the Output Devices
=====
Please enter the required settings for
- Graphic Card Types (AGX-3000 or AGX-3281)
- Output Signal (analog or digital)
- Monitor Resolution (only for analog devices)
- Refresh Rate
- Screen Arrangement
```

Graphic card

Select the graphic card. TRANSFORM A supports from X server release 3.4 on exclusively the UGX and AGX GRAPHIC CARDS.

```
Setting the graphic card type
-----
1 - "AGX-3000"
2 - "AGX-3281"
```

Enter the graphic card [2]: 2

Output signal

Select the output signal type.

```
Configuring the output signal
-----
1 - "Analog"
2 - "Digital"
```

Enter the output signal [2]: 2

Monitor resolution and refresh rate

If you have analog output the monitor resolution and the refresh rate has to be specified. In case of analog and digital mixed output just the refresh rate for the analog outputs is to be specified.

Multi-screen server display layout

The arrangement of the connected projection modules is specified in the form:

<w>x<h>

Here <w> and <h> give the number of columns and rows. For example:

4x2

4 monitors next to each other, 2 monitors on top of each other.

Configuring the Monolithic X Server Multiscreen Arrangement

Enter the Multi Screen Arrangement (Width x Height) [2x1]: **4x2**

These are your Output Device settings

=====

- Graphic Card: AGX-3281
- Output Device: digital
- Screen Configuration : MultiScreen (4x2)

Everything correct? (yes/no)? [yes]: **y**

X Server General Settings

=====

Please enter the required settings for

- Visual Depth
- Visual Class
- X Server's background RGB values
- XDM
- Font Server

Depth resolution

Specifying the depth resolution tells X.11 how many colors you want to use.

Configuring the Depth resolution (Bit Per Pixel)

(N,B: 4 and 5 are Usable only for resolution up to 1400x1050)

- 1 - for 8 bpp (256 colors)
- 2 - for 16 bpp (64K colors)
- 3 - for 32 bpp (16M colors)
- 4 - for 8 and 16 bpp (MultiDepth/MultiColor: Default visual = PseudoColor)
- 5 - for 16 and 8 bpp (MultiDepth/MultiColor: Default visual = TrueColor)

Enter the depth resolution [2]: **4**

Dependent on the configuration and the requirements for video the depth resolution must be selected. An extensive overview about correlation between settings of X.11 and the display of video as well as an explanation of multi-color-depth is given in section [4.2.2 Color capabilities](#). An overview about bandwidth requirements of video and RGB in dependence of color depth is given in section [4.6.1 The input cards](#).

Visual class

Specifying a visual class tells X.11 how to handle colors. This is only asked if you selected above the numbers 2 or 4. Refer also to section [4.2 Color management](#) for a more detailed description, please!

Background of the X server

The background of the X server can be set. Specify, if you want to set your individual background color and how. In RGB values red is 255 0 0, green is 0 255 0 and blue is 0 0 255. You can choose any combination of these colors within the range of 0 to 255.

Configuring the X Server's background

Do you want set the X-Server's background color (yes/no)? [yes]: **yes**

Enter the RGB values [range 0..255] [0 0 0]: **40 40 200**

X display manager

The X display manager, `xm`, is a system process which manages a user session from the login to the logout. `xm` provides a flexible and configurable method for logging in with an X server. Refer to section [4.3 X Display manager](#) for a more detailed description, please!

Entering **y** allows you to specify the query type, entering **n** causes X.11 to start without `xm`.

- `query` will connect you directly to the specified XDM;
- `indirect` will cause a chooser box to be opened, where you can select your XDM;
- `broadcast` will connect you to the XDM that replies first to your request.

Configuring X Display Manager (XDM)

The local X Display Manager can be used to login on the Eos X Terminal.

Do you want start the X Server with XDMCP (yes/no)? [yes]: **y**

Set the XDMCP Query Types

- 1 - query (direct)
- 2 - indirect
- 3 - broadcast

Enter query type [2]: **2**

Enter the ip address of your XDM [150.158.181.149]: **199.123.222.17**

Font server

Please specify, if you want to use a font server. If necessary clarify the IP address as well as the respective port number with your network administrator!

Configuring the Font Server

If you want a Font Server which supplies fonts for the X Server, please answer the following question with either 'y' or 'n'

Do you want to use a Font Server (yes/no)? [yes]: **y**

Enter the ip address of your Font Server [150.158.181.149]: **199.123.222.17**

Enter the Font Server's port number [7100]: **7100**

The script lists your settings. Examine the values and confirm them by entering **y** or enter **n** for repeating the previous configuration steps.

These are your X Server General Settings

=====

- Bits Per Pixel: 8 and 16
- Visual Class: default visual = PseudoColor; 2nd visual = TrueColor
- X Server's RGB Values: 40 40 200
- XDM Protocol: -indirect 199.123.222.17
- Font Server: tcp/199.123.222.17:7100

Everything correct? (yes/no)? [yes]: **y**

Channel reordering

For some installations it is useful to change the order of the projection channels. This can be assigned in the Channel Reordering section. If you want to reorder the projection channels enter **y**. By entering **n** this section will be skipped.

```
X Server's Channel Reordering
```

```
=====
```

```
This is the reordering configuration part of the X Server.
It offers the possibility to define the reordering channels section.
The channels section defines the assignment of graphic channels
to projection channels.
Please read the section "X Server Configuration" in the
User's Manual "Eos X Terminal"
```

```
Do you want to proceed (yes/no)? [no]: y
```

The correlation between graphic channels and projection channels is explained in section [6.1.6 Advanced configuration of TransForm A \(channels\)](#). Please have a look there to have a further explanation.

```
Channel Reordering
```

```
=====
```

```
Assign to a default graphic channel
a new position in the Display Wall
```

```
Channel Reordering:
```

```
-----
```

```
1: redefine reordering
```

```
2: take default (no reordering)
```

```
Enter selection [1]: 1
```

```
Enter the list of the default channels [1 2]: 1 2 3 4 5 6 7 8
```

```
Enter the list of the new channels [2 1]: 1 3 5 7 2 4 6 8
```

```
These are the Reordering Settings for the Monolithic X Server:
```

```
=====
```

```
      :  1  2  3  4  5  6  7  8
--> :  1  3  5  7  2  4  6  8
```

```
Everything correct? (yes/no)? [yes]: y
```

Fire wall

A firewall security level can be set. Four different levels (high, medium, disabled, user defined) can be chosen to disable unneeded network services.

The four security levels allow selecting between the following characteristics:

General Restrictions	
X Display Manager	X Display Manager xdm can only be started and port 177 is only accessible, if it was indicated in the section above (X Display Manager) to start xdm.
Font Server	The Font Server xfs can only be used if it was indicated in the section above (Font Server) to use a Font Server.
Network File System	The Network File System NFS is only activated if a distributed system is configured.
Root Filesystem	The root filesystem "/" is only exported if a distributed system is configured and it can only be mounted to the rendering machines.
High	
TCP/UDP ports	all ports less or equal 1023 are disabled except: TCP/UDP port 177 for XDMCP TCP/UDP port 161 for SNMP
daemons	the following daemons are disabled: rsh-daemon login-daemon secure shell daemon
Medium	
TCP/UDP ports	all ports less or equal 1023 are disabled except: TCP/UDP port 177 for XDMCP TCP/UDP port 161 for SNMP TCP port 513 for rlogin TCP port 514 for rsh TCP port 22 for secure shell
daemons	the following daemons are enabled: rsh-daemon login-daemon secure shell daemon
Disable	
TCP/UDP ports	all ports are enabled
daemons	the following daemons are enabled: rsh-daemon login-daemon secure shell daemon
User defined (don't change the existing firewall policies)	
TCP/UDP ports, rsh-daemon, login-daemon, secure shell daemon	None of these ports and daemons is disabled. Changes in the configuration of these ports and daemons by the user, will not be changed by the X.11 configuration.

Table 3-5
Security options

```

Setting the Eos FireWall Policies
=====
If you want to configure the Eos as secure
X Terminal, choose the policy "high"
then only X11-Connection are permitted

Choose one of the FireWall Policies
-----
1 - "High"
2 - "Medium"
3 - "Disable"
4 - "Don't change the existing FireWall Policy"

Enter the FireWall Policies [2]: 2

You have chosen the FireWall Policy "Medium"
Is this correct? (yes/no)? [yes]:y

```

Finishing the configuration

If you do install a monolithic TRANSFORM A, configuration is done and the script is finished with the next step. When configuring a distributed system you have to specify the data for the central device and the rendering machines. See section [3.4.3 Configuring a distributed system](#).

```

*****
*                                     *
* The X Server configuration is finished now, *
*           please enter your choice           *
*                                     *
*****

1 Exit configuration (all your current entries will be lost)
2 Finish configuration

Enter your X Server Configuration [2]:2

```

Configuring the X Server. Please wait ...

```

*****

Multiscreen X Server setup done... Have fun!

NOTE: enter "service mmtserv"
      to start the X Server

*****

```

When configuration is completed, you can enter **service mmtserv** to start the X server:
 eos:/opt/MMT2686/config # **service mmtserv**



If you operate TRANSFORM A in extended safety boot mode, please take care to update the backup partition after successful configuration, see section [4.8.5 Backup and restore procedures](#) (eosxs Utility).

3.4.3 Configuring a distributed system



Configuring a distributed system is largely similar to configuring a monolithic system. See section 3.4.2 X.11 configuration for the basic course of the installation script. This section describes the additional part for configuring a distributed system.

On the one hand, the additional sections in the configuration of a distributed system contain the specification of the sub-net and on the other hand, the successive parameterization of every individual rendering machine.

Sub-net

Indicate the transmission rate of the sub-net network card and the desired interface type!

The IP address of the sub-net network card of the central device must be specified identical to the IP address specified with **linuxconf**. See section 3.4.1 System configuration.



You have to insert the sub-net specification according to the specifications explained in section 3.4.1 System configuration. Changes have to be made in a consistent way in both places.

```
Configuring the Distributed X Server
=====
```

```
Subnet Conofiguration
-----
```

```
Enter IP Address for the Subnet [192.168.149.254]: 192.168.60.0
Enter Subnet Netmask [255.255.255.0]: 255.255.255.0
```

Rendering machines

The parameterization of the rendering machines is carried out successively for every device. For every rendering machine, the arrangement of the Barco projection modules is indicated in the following form:

```
<w>x<h>
```

Here <w> and <h> give the number of columns and rows. For example:

```
4x2
```

4 monitors next to each other, 2 monitors on top of each other.

For every rendering machine, the position of the projection modules – this is the position of the upper left module – is indicated, in the following form:

```
<x>,<y>
```

Here <x> and <y> give the horizontal and vertical position within the display wall starting with the upper left module as 0,0.

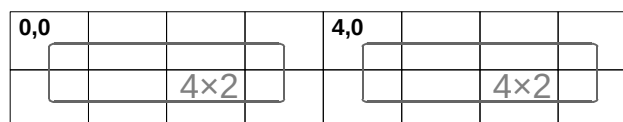


Figure3-57

For each rendering machine a unique IP address within the specified sub-net must be provided. In addition the Ethernet addresses of the rendering machines' network cards must be entered. The Ethernet address is printed on a label on the network card. For example:

EA=00.60.97.78.29.0a

As well the Ethernet address of a rendering engine can be read from its output on the corresponding display during the boot process.

Rendering Engines' Configuration

```
-----
Enter number of Rendering engines [2]: 2
IP address for engine 1 [192.168.149.1]: 192.168.60.1
Ethernet address for engine 1 [00.00.00.00.00.00]: 00.60.08.a6.a9.58
Screen arrangement for engine 1 (Width x Height) [2x4]: 4x2
Display's Position for engine 1 (X,Y) [0,0]: 0,0

IP address for engine 2 [192.168.149.2]: 192.168.60.2
Ethernet address for engine 2 [00.00.00.00.00.00]: 00.60.08.a6.a9.73
Screen arrangement for engine 2 (Width x Height) [2x4]: 4x2
Display's Position for engine 2 (X,Y) [0,0]: 4,0
```

Next there is the choice to enable Wake On LAN for the network adapters of the rendering machines. From Release 3.48 of the X server on, PXE can be used to boot the rendering machines. In this case Wake On LAN must be activated, to enable the rendering machines to boot and reboot reliable. If still the Etherboot mechanism is used Wake On LAN can also be activated but there is no need to do so.

Please refer to section [3.2.13 Network](#) for a short explanation of Etherboot and PXE boot mechanism and in case you activate WOL check also for the appropriate BIOS settings, see section [6.1.11 BIOS settings for rendering machines](#).

Engine's boot mode Configuration

```
-----
The Engines can be switched on by the Core Machine
by using the WOL (Wake On LAN) facility.
(NB: When using WOL you have to enable WOL
      also in the motherboard BIOS)
Do you want to use WOL (yes/no)? [no]: yes
```

The script lists your settings. Examine the values and confirm them by entering **y**, or enter **n** for repeating the previous installation steps.

These are your Distributed X Server settings

```
=====
- Subnet IP:                192.168.149.254
- Subnet Netmask:           255.255.255.0
- NIC card:                 100 Mbit
- Number Engines :         2
- Values for Engine 1:      IP = 192.168.149.1 Ether = 00.60.08.a6.a9.58
                           arrangement = 4x2 position = 0,0
- Values for Engine 2:      IP = 192.168.149.2 Ether = 00.60.08.a6.a9.73
                           arrangement = 4x2 position = 4,0
- WakeOnLAN :              Yes
Everything correct? (yes/no)? [yes]: y
```

Channel reordering

For some installations it is useful to change the order of the projection channels. This can be assigned in the Channel Reordering section. If you want to reorder the projection channels enter **y**. By entering **n** this section will be skipped.

X Server's Channel Reordering

```
=====
This is the reordering configuration part of the X Server.
It offers the possibility to define the reordering channels section.
The channels section defines the assignment of graphic channels
to projection channels.
Please read the section "X Server Configuration" in the
User's Manual "Eos X Terminal"
```

```
Do you want to proceed (yes/no)? [no]: y
```

The order can be changed only within the rendering machines (graphic engines). First the engine has to be indicated then the graphic channels (default) and the projection channels (new) can be entered. The correlation between graphic channels and projection channels is explained in section [6.1.6 Advanced configuration of TransForm A \(channels\)](#). Please have a look there to have a further explanation.

```

Channel Reordering for the Distributed X Server
=====
Assign to a default graphic channel within a
graphic engine a new position in the
Display Wall

Enter graphic engine's number for reordering[1]: 1

Channel Reordering:
-----
1: redefine reordering
2: take default (no reordering)
Enter selection [1]: 1
Enter the list of the default channels [1 2]: 1 2 3 4
Enter the list of the new channels [2 1]: 1 2 4 3
Reordering of a new engine? (yes/no)? [no]: y

Enter graphic engine's number for reordering[2]: 2

Channel Reordering:
-----
1: redefine reordering
2: take default (no reordering)
Enter selection [1]: 1
Enter the list of the default channels [1 2]: 1 2 3 4
Enter the list of the new channels [2 1]: 4 3 2 1
Reordering of a new engine? (yes/no)? [no]: n

These are the Reordering Settings for the Distributed X Server:
=====
engine_1 :   1   2   3   4
--> :   1   2   4   3
engine_2 :   1   2   3   4
--> :   4   3   2   1

Everything correct? (yes/no)? [yes]: y

```

Logical video channels

The assignment of the adapters of QUAD ANALOG VIDEO CARDS, DUAL DVI INPUT CARDS or QUAD SDI VIDEO CARDS to »logic« video channels can be defined. This assignment is explained in detail in section [6.1.6 Advanced configuration of TransForm A \(video\)](#). The numbers of the assigned channels result like described there and have to be inserted into the lines of the respective rendering machines (engine-1, etc.).

```

Logical Video Channels
=====
This is the configuration part for the assignment of Physical Video Adapters
to Logical Video Channels.
This assignment specifies which video is displayed on which part of
the Display wall.
Please read the section "X Server Configuration" in the
User's Manual "Eos X Terminal"

Do you want to proceed (yes/no)? [no]: y

Logical Video Channels:
-----
1: define Video settings
2: take default Video settings
Enter selection [1]: 1
Enter for each video channel the video adapters for engine-1 [1]: 1 2 0
Enter for each video channel the video adapters for engine-2 [1]: 0 1 2

These are the Logical Video settings for the Distributed X Server:
=====
engine_1 : 1 2 0
engine_2 : 0 1 2

Everything correct? (yes/no)? [yes]: y

```

Finishing the configuration

Distributed X Server setup done... Have fun!

NOTE: enter "service mmtserv"
to start the Distributed X Server

When configuration is completed, you can enter **service mmtserv** to start the X server:

eos:/opt/MMT2686/config # **service mmtserv**



If you operate TransForm A in eXtended safety boot mode, please take care to update the backup partition after successful configuration, see section [4.8.5 Backup and restore procedures](#) (eosxs Utility).

3.4.4 Configuring a distributed system with multiple logical screens



Configuring a distributed system with multiple logical screens is largely similar to configuring a distributed system without multiple logical screens. See section 3.4.2 X.11 configuration for the basic course of the installation script. This section describes the additional part for configuring multiple logical screens.

More information concerning multiple logical screens can be found in the sections [4.1 Multi-screen capability](#) and [6.1.6 Advanced configuration of TransForm A](#). The configuration runs mostly along the X.11 configuration and the configuration of a distributed system.

Mode of multiple logical screens

Select the multiple logical screens mode. If you select separate mode you are also prompted to indicate whether you want cursor wrap or not (Please see the keyword NoCursorWrap in section [6.1.6 Advanced configuration of TransForm A – geometry](#)).

```
Configuring the Multiple Logical Screen X Server
=====
```

```
There are two modes of MLS operation
```

- 1 - Contiguous mode
- 2 - Separate mode

```
Please enter the MLS mode [1]:
```

```
Switching on the cursor wrap around feature (yes/no)? [no]: no
```

Subnet and rendering machines

Next the Sub-net and the rendering machines are configured. Please see section [3.4.3 Configuring a distributed system](#). The number of rendering machines (graphic engines) is asked. For each rendering machine the IP address and the arrangement must be specified. The position of the machine is only asked, if you configure continuous mode. Furthermore the type of the graphic card must be indicated and the depth resolution must be assigned.

```
Subnet Configuration
```

```
-----
Enter IP Address for the subnet NIC card[192.168.1.254]:
```

```
Enter Sub Netmask of graphic engines [255.255.255.0]:
```

```
Graphic Engines' Configuration
```

```
-----
```

```
Enter number of graphic engines [2]:
```

```
IP address for engine 1 [192.168.1.1]:
```

```
Ethernet address for engine 1 [00.00.00.00.00.00]: 00.a0.c0.83.76.98
```

```
Screen arrangement for engine 1 (Width x Height) [2x4]: 2x2
```

```
Position for engine 1 (X,Y) [0,0]:
```

```
Graphic card type for engine 1
```

- 1 - "AGX-3000"
- 2 - "AGX-3281"

```
Enter the graphic card type [1]: 2
```

```
Configuring the Depth Resolution (Bit Per Pixel)
```

```
-----
```

- 1 - for 8 bpp (256 colors)
- 2 - for 16 bpp (64K colors)
- 3 - for 32 bpp (16M colors)
- 4 - for 32 bpp (16M colors)

```
Enter the Depth Resolution [3]: 2
```

```
Configuring the Visual Class
```

```
-----
```

A visual class describes the characteristics of a virtual colormap, that has been or can be created for use a particular screen

The following visual class are supported.

- 1 - TrueColor (read only visual)

```

2 - DirectColor (read/write visual)

Enter the Visual Class [1]: 1

IP address for engine 2 [192.168.1.2]:
Ethernet address for engine 2 [00.00.00.00.00.00]: 00.a0.c0.83.54.77
Screen arrangement for engine 2 (Width x Height) [2x4]: 2x2
Position for engine 2 (X,Y) [0,0]: 2,0
Graphic card type for engine 2
1 - "AGX-3000"
2 - "AGX-3281"
Enter the graphic card type [1]: 2

Configuring the Depth Resolution (Bit Per Pixel)
-----
1 - for 8 bpp (256 colors)
2 - for 16 bpp (64K colors)
3 - for 32 bpp (16M colors)

Enter the Depth Resolution [3]: 2

Configuring the Visual Class
-----
A visual class describes the characteristics of a virtual colormap,
that has been or can be created for use a particular screen

The following visual class are supported.
1 - TrueColor (read only visual)
2 - DirectColor (read/write visual)

Enter the Visual Class [1]: 2

These are your MLS Server settings
=====
- Core machine's second IP: 192.168.1.254
- Engines Netmask Address: 255.255.255.0
- Operational mode : Contiguous
- Number engines : 2
- Values for engine 1: IP = 192.168.1.1 Ether = 00.a0.c0.83.76.98
                        arrangement = 2x2 position = 0,0
                        AGX-3281: Bpp = 16 Visual = TrueColor

- Values for engine 2: IP = 192.168.1.2 Ether = 00.a0.c0.83.54.77
                        arrangement = 2x2 position = 2,0
                        AGX-3281: Bpp = 16 Visual = DirectColor

Everything correct? (yes/no)? [yes]:

```

Finishing the configuration

After specifying the parameters for multiple logical screens the values explained in section 3.4.2 X.11 configuration and section 3.4.3 Configuring a distributed system must be indicated.

```
*****
```

MLS X Server setup done... Have fun!

NOTE: enter "service mmtserv"
to start the EOS Distributed X Server

```
*****
```

When configuration is completed, you can enter **service mmtserv** to start the X server:
eos:/opt/MMT2686/config # **service mmtserv**



If you operate TransForm A in eXtended safety boot mode, please take care to update the backup partition after successful configuration, see section 4.8.5 Backup and restore procedures (eosxs Utility).

4 Operating

This chapter shows the capabilities that TRANSFORM A offers displaying graphics and video. The multi-screen capability of TRANSFORM A, the extensions of the X server and the X window system's strategies for color management are explained. You are introduced into operating the video client for displaying video and RGB signals and the remote control client for controlling a Barco display wall.

4.1 Multi-screen capability

An essential feature of TRANSFORM A is the **multi-screen** capability, which differs in some points from the multi-head mode of a conventional X server.

The X server of TRANSFORM A allows a root window that extends over all connected projection modules. In this case, X clients use the whole display area, without even knowing this (**transparent multi-screen**).

For an exact description of the differences between multi-screen and multi-head mode, the terms **display** and **screen** of X.11 terminology are important:

Display

A display contains all input and output devices, which are assigned to an X server. Two or more displays may be installed on a single computer. In this case several X servers are running each of which has its own keyboard (mouse, tablet etc.) and its own screen; however, both servers operate logically independent from each other so that two separate workplaces are available.

Screen

A screen is a logic output device of an X server which is represented generally by a physical output device. An X server can quite operate several screens. However, such a construction has only one keyboard and one mouse. It is a workplace for a single person.

The difference between a conventional X server in multi-head mode with several monitors and the multi screen-capable TRANSFORM A controlling a display wall is described below.

Multi head

Every screen is represented in the multi-head mode by a corresponding monitor and has its own root window. An X client, which is connected to this server can open windows on both screens. However, an individual window is always completely attached to a screen. Moreover, the client must be specifically programmed for the use of several screens, what is hardly the case among standard X.11 applications. In addition, when starting such clients the output screen must be indicated immediately. Finally there are only few window managers, which allow consistent management over several screens.

Multi screen

In multi-screen mode TRANSFORM A offers – in the sense of X.11 – only a single root window, which extends over the whole display wall with an unlimited number of projection modules. Every window manager allows to position the windows of any client somewhere on the display wall, to displace them to another projection module or even to expand them over several or all projection modules simultaneously.

Multiple logical screens

With the multiple logical screens mode TRANSFORM A combines in a way the multi-head mode and the multi-screen mode. It allows one X server to display multiple screens each on an individual rectangular array of $m \times n$ graphic channels. Each screen can be configured with its own color depth and visual class. Multiple logical screens can only be used with a distributed system. Each rendering machine displays one screen.

The configuration of multiple logical screens is explained in section [6.1.6 Advanced configuration of TransForm A \(geometry\)](#).



Note that multiple logical screens can not be used simultaneously together with the X MultiCursor extension (XMC), see section [4.4 X Server extensions](#).

4.2 Color management

4.2.1 Basic understanding

The translation between RGB values specified in applications and the color displayed on-screen is controlled by pixel values serving as indices to a color map. The application obtains the pixel values from the X window system.

RGB values

RGB values are the red, green and blue intensity values that are used to define a color. According to the X.11 protocol these values are represented as 16-bit, unsigned numbers, with 0 the minimum intensity and 65535 the maximum intensity. Most hardware however represents each value as a number in the range from 0 to 255.

Color map

A color map consists of a set of numbered entries – so called color cells – defining pixel values. Each color cell contains a single RGB triple – a combination of RGB values. The color map will be filled at runtime.

X.11 supports two ways for handling color maps:

- **shared color cell**
Colors that can be used by different X clients are called shared colors. A color that was once allocated can not be changed. When an X client is requesting for a shared color the X server searches the color map for exactly the requested color (exact match). If the color is not found a new color will be allocated in the color map.
- **private color cell**
A color that can only be used by one client is considered to be a private color. Only the client that allocated it can use a private color. A client is able to change the contents of a private cell. As long as entries are available in the color map, private colors can be allocated.

Color depth

On a black-and-white screen, each pixel is represented with a single binary digit, i. e. a color depth of 1. Many color workstations have a color depth of 8bit, each pixel on such a screen is represented by eight bits, allowing $2^8 = 256$ on-screen colors. A color depth of 24 bits corresponds to $2^{24} = 16.7$ million (16M) colors and is said to cover all shades of colors the human eye can distinguish.

Visual class

Due to the different display capabilities of workstations reaching from a color depth of 1 bit up to 24 bits different strategies for translating pixel values into on-screen colors have been developed in the X window system. These strategies are called visual classes.

The X window system defines six visual classes, three of them are dynamic (**PseudoColor**, **GrayScale**, **DirectColor**) and three are static (**StaticColor**, **StaticGray**, **TrueColor**):

- **PseudoColor**

is a class having a color map in which a pixel value indexes the color map entry to produce an independent RGB value; that is, the color map is viewed as an array of triples (RGB values). Shared and private color cells can be allocated.

- **StaticColor**

can be viewed as a case of PseudoColor in which the RGB values are predefined and read-only; no private color cells are available.

- **GrayScale**

can be viewed as a case of PseudoColor, in which the red, green, and blue values in any given color map entry are equal and thus, produce shades of gray. Shared and private color cells can be allocated.

- **StaticGray**

can be viewed as a case of GrayScale in which the gray values are predefined and read-only; no private color cells are available.

- **DirectColor**

is a class of color map in which a pixel value is decomposed into three separate subfields for indexing. The first subfield indexes an array to produce red intensity values. The second subfield indexes a second array to produce blue intensity values. The third subfield indexes a third array to produce green intensity values. Shared and private color cells can be allocated.

- **TrueColor**

can be viewed as a case of DirectColor in which the subfields in the pixel value directly encode the corresponding RGB values. That is, the color map has predefined read-only RGB values.

Further documentation

The color management of the X window system is explained in more detail in:

- **The Definitive Guide to the X Window System – Volume 1**

Adrian Nye, O'Reilly & Associates, Inc.

- **Introduction to the X Window System**

Oliver Jones, Prentice Hall, Inc.

4.2.2 Color capabilities

Visual classes

For operating TRANSFORM A you can use the following combinations of visual class and color depth, depending on which kind of application is to be displayed:

- **DirectColor, 16bit (R: 5bit, G: 6bit, B: 5bit) for displaying video**
 2^{16} = 64K colors can be displayed. Shared and private color cells are available.
- **DirectColor, 32bit (R: 8bit, G: 8bit, B: 8bit) for displaying video**
 2^{24} = 16M colors can be displayed. Shared and private color cells are available.
- **TrueColor, 16bit (R: 5bit, G: 6bit, B: 5bit) for displaying video**
 2^{16} = 64K colors can be displayed. The possible RGB values in the color map are predefined in equidistant steps. Thus it is guaranteed that the whole spectrum of colors is covered.
- **TrueColor, 32bit (R: 8bit, G: 8bit, B: 8bit) for displaying video**
 2^{24} = 16M colors can be displayed. The possible RGB values in the color map are predefined in equidistant steps. Thus it is guaranteed that the whole spectrum of colors is covered.
- **PseudoColor, 8bit with NearBy Color Allocation for displaying pure 8 bit applications**
 2^8 = 256 colors out of 256^3 = 16M can be displayed. Shared and private color cells are available. The maximum number of shared and private color cells together is 256.

NearBy color allocation

X clients may exit on an allocation of a shared or private color cell, if the color map is already full and the requested color cell is not included in the color map, yet. However, the NearBy Color Allocation guarantees, that each request for a shared color cell returns a color cell, whether or not the color map is already full or an entry in the color map matches the request. Please, refer to section [6.1.9 Nearby color allocation](#) for more details.

Multi-color-depth

With the multi-color-depth option of the X server two color modes, 8 bit PseudoColor and 16 bit TrueColor, are available for X clients in parallel. The root window runs in one color mode whereas X clients may also display windows in the other color mode. Multi-color-depth can be configured in the following way:

- 8 bit PseudoColor for the root window and 8 bit PseudoColor or 16 bit TrueColor as Option for X clients
- 16 bit TrueColor for the root window and 8 bit PseudoColor or 16 bit TrueColor as Option for X clients.

By default most X clients start in the same color mode that the X server uses for the root window. Some X clients have the ability to use alternatively another color mode. There are two types of such X clients that can make use of this feature:

- X clients that need to be started with an option identifying the wanted color mode
- X clients that have the ability to automatically start in the color mode most suitable to display their content

This feature is available with UGX GRAPHIC CARDS and for resolutions up to 1400×1050.

OmniScaler

The OMNISCALE enables to display video and RGB sources no matter in what color mode and color depth the X server operates. Thus optimal integration of 8 bit PseudoColor applications with high quality video and RGB display is possible. If the X server operates in 8 bit PseudoColor mode, the video / RGB window is displayed in YUV4:2:2 / 16 bit TrueColor mode. Complete correlation between color mode of the X Server and the video/RGB window is listed in the table below.

Module video

With Module Video the video or RGB signals of the QUAD ANALOG VIDEO CARD, DUAL DVI INPUT CARD, STREAMING VIDEO CARD, QUAD SDI VIDEO CARD or DUAL RGB INPUT CARD are displayed without borders and fitted to complete projection modules (1 to n×n, depending on configuration). The same color capabilities apply as with movable and scalable video and RGB windows. Please, refer also to section 4.6.3 [The Xvideo client](#) for more details.

Dual RGB Input Card

The DUAL RGB INPUT CARD offers the possibility to provide RGB data either in 16 bpp (RGB 5:6:5) or in 24 bpp (RGB 8:8:8). Switching between these two modes requires a restart of the X server with the respective option set, please refer to section 6.1.5 [X server parameters](#).

Overview of color capabilities

The following table lists color depth and format of the video and of the X clients in dependence of color depth and visual class of the X server. The video and RGB color format applies with module video as well as with video in a window.

	QUAD ANALOG VIDEO CARD / QUAD SDI VIDEO CARD / STREAMING VIDEO CARD ³⁾ / DUAL DVI INPUT CARD ⁵⁾	DUAL RGB INPUT CARD / STREAMING VIDEO CARD ⁴⁾ / DUAL DVI INPUT CARD ⁶⁾	application windows of X clients
PseudoColor 8 bit	Video in YUV4:2:2	RGB format with 16 bpp or RGB format with 24 bpp ²⁾	color mode of X server
multi-color-depth PseudoColor 8 bit and TrueColor 16 bit overlay ¹⁾	Video in YUV4:2:2	RGB format with 16 bpp or RGB format with 24 bpp ²⁾	color mode of X server or 16 bit TrueColor
DirectColor 16 bit	Video in YUV4:2:2	RGB format with 16 bpp or RGB format with 24 bpp ²⁾	color mode of X server
TrueColor 16 bit	Video in YUV4:2:2	RGB format with 16 bpp or RGB format with 24 bpp ²⁾	color mode of X server
multi-color-depth TrueColor 16 bit and PseudoColor 8 bit overlay ¹⁾	Video in YUV4:2:2	RGB format with 16 bpp or RGB format with 24 bpp ²⁾	color mode of X server or 8 bit PseudoColor
DirectColor 32 bit	Video in YUV4:2:2	RGB format with 16 bpp or RGB format with 24 bpp ²⁾	color mode of X server
TrueColor 32 bit	Video in YUV4:2:2	RGB format with 16 bpp or RGB format with 24 bpp ²⁾	color mode of X server

Table 4-1
color capabilities for X server and video of TRANSFORM A

1) Only applicable, if UGX GRAPHIC CARDS are used.

2) Depending on X server start option, only with DUAL DVI INPUT CARD and DUAL RGB INPUT CARD.

3) Valid for STREAMING VIDEO CARD configured for any compression algorithm except **scn_dec**.

4) Valid for STREAMING VIDEO CARD configured for compression algorithm **scn_dec**.

5) Valid for DUAL DVI INPUT CARD with sources of type 1, 2.

6) Valid for DUAL DVI INPUT CARD with sources of type 3, 4, 5.

4.3 X Display manager

The X display manager `xdm` is a system process which manages a user session from the login to the logout. The `xdm` provides a flexible and configurable method for logging in with an X server. The `xdm` can be configured such that X.11 clients are started automatically. The X server is reset for the next login following each user log-out.

X display manager of TRANSFORM A

The X display manager comes pre-installed with the system on TRANSFORM A. Depending on the actual configuration the `xdm` is started automatically and opens a chooser box offering all possible `xdm` hosts accessible by TRANSFORM A.

On TRANSFORM A there are manual pages about the `xdm` available. For reading these man pages enter **man xdm** in the command line:

```
eos:/root # man xdm
```

X display manager of host computers

The X display manager for the host computers of TRANSFORM A is not included in the delivery of TRANSFORM A.

Further documentation

The X display manager is documented in:

- **X Window System Administrators Guide – Volume 8**
O'Reilly & Associates, Inc.

This document specifically describes all configuration possibilities for the X display manager using corresponding files.

4.4 X Server extensions

Besides some standard X server extensions TRANSFORM A offers a set of additional specialized X server extensions. These extensions are mentioned here briefly. Full documents for software development are available on request.

X MultiCursor (XMC)

The X MultiCursor extension allows the simultaneous use of several mouse pointers, which can be moved independently from each other over the root window. The XMC extension behaves like the standard X.11 input extension of the X Consortiums and can be handled exactly the same way.



Note that the X MultiCursor can not be used simultaneously together with multiple logical screens, see section [4.1 Multi-screen capability](#).

X Blink

With the X Blink extension, a blinking property can be put on shared color cells. A blinking color has two color information. These two colors are changed with an optional frequency. DIN blinking frequencies are provided.

X Video

The X Video extension for connecting a Barco video input card is dealt with in detail in the following chapter.

X UCL

This extension is required for OSIRIS. The functionality includes authorization mechanisms for X Clients and support of constraint areas for windows.

X MVGS

This extension is required for OSIRIS. It offers layout configuration management and remote pointer.



Multiple logical screens can be used together with Osiris and the X MVGS, X UCL extension only in the contiguous mode.

X Genlock

The X Genlock extension enables to synchronize the graphic output to the frame rate of an internal or external video source or to the clock of one UGX or AGX GRAPHIC CARD. The usage of X Genlock is explained in the following sections.



Genlock is available in an OmniBus configuration only!

4.5 Window manager

The window manager, which is pre-configured on TRANSFORM A offers a convenient and fast way to choose certain commands. By clicking on the root window background depending on left click or right click a menu opens.

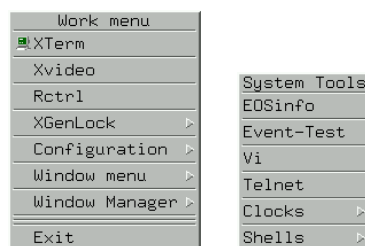


Figure 4-1
Left click and right click on the root window background

Work menu

Xterm	Start X terminal window
Xvideo	Start Xvideo client for displaying video and RGB
Rctrl	Start REMOTE-CONTROL client, only applicable if the REMOTE-CONTROL daemon is running, please refer to section 4.7.1 The Remote-Control daemon <i>only applicable in an OmniBus configuration</i>
XGenLock	Select the first channel of the first QUAD ANALOG VIDEO CARD for genlocking
Select QAVC (Quad Analog Video Card)	Select the first channel of the first STREAMING VIDEO CARD for genlocking
Select SVC (Streaming Video Card)	Select the first channel of the first QUAD SDI VIDEO CARD for genlocking
Select QSDI (Quad SDI Video Card)	Select the first channel of the first DUAL DVI INPUT CARD for genlocking
Select DDVI (Dual DVI Input Card)	Select the first UGX or AGX GRAPHIC CARD for genlocking
Select Intern	Select the external genlock signal for genlocking
Select Extern	Switch genlocking off
OFF	Switch genlocking on
ON	Read and apply the last saved genlock settings
Read Config File	Save the current genlock settings and apply them automatically after system restart
Save Config File	



When using genlock make sure, that the cabling for genlock has been established as explained in section [3.2.15 CPU board](#).

If an external signal is connected only external may be selected. If selecting internal or a video signal it will be disturbed by the external signal. Therefore the external signal should be unplugged before switching to another type of genlock!

Configuration	
Screensaver	
Default	Set screensaver to default settings
Immediately	Set screensaver to immediate screensaving
Blank	Set screensaver to blank display
Pattern after 5 min	Set screensaver to switch off pattern after 5 minutes
off	Switch screensaver off

Mouse	
fast	Set speed of mouse to fast
normal	Set speed of mouse to normal
slow	Set speed of mouse to slow
Left handed mouse	Configure mouse for left handed operation
Right handed mouse	Configure mouse for right handed operation
System beep	
loud and long	Set system beep to loud and long
loud	Set system beep to loud
normal	Set system beep to normal
off	Switch off system beep
Root Background	
BARCO logo	Select Barco logo as background for root window
Standard black	Select black as background for root window
Standard white	Select white as background for root window
Standard gray	Select gray as background for root window
Standard navy blue	Select navy blue as background for root window
Grid 640x480	Selection of various adjustment grids (maintenance)
...	
Grid 1600x1200	
Grid 640x480 bold	
...	
Grid 1600x1200 bold	
X Server	
default mode	Restart X server in default color mode
pseudo 8 Bit color mode	Restart X server in PseudoColor mode, 8bpp
true 16 Bit color mode	Restart X server in TrueColor mode, 16 bpp
direct 16 Bit color mode	Restart X server in DirectColor mode, 16 bpp
true 32 Bit color mode	Restart X server in TrueColor mode, 32 bpp
direct 32 Bit color mode	Restart X server in DirectColor mode, 32 bpp

Alternatively the X server can be restarted by means of the restart X server utility, please refer to section [4.8.4 Restart X server utility \(service mmtserv\)](#).



It is not possible to restart the X server in multi-color-depth, if an other color mode has been configured in the X.11 configuration.

But if the X server has been configured in multi-color-depth it can be restarted with the other color depths mentioned above. To revert to multi-color-depth the X server must be restarted in the default mode.



Please keep in mind that a higher color depth requires also a higher bandwidth for graphic data.

In addition, changing the color mode of the X server may change the color mode of video or RGB and lead therefore also to an increase in required bandwidth for video, please refer to section [4.2.2 Color capabilities](#) to see which video color mode applies for which X server color mode and to section [4.6.1 The input cards](#) to see the required bandwidth for video and RGB.

Both effects may lead to a loss of performance!

WM Policy	
Auto raise on	(Please, refer to the fvwm2 man pages!)
Auto raise off	(Please, refer to the fvwm2 man pages!)
Click to Focus	(Please, refer to the fvwm2 man pages!)
Focus Follows Mouse	(Please, refer to the fvwm2 man pages!)
Virtual-Desktop	
Virtual Desktop on	(Please, refer to the fvwm2 man pages!)
Virtual Desktop off	(Please, refer to the fvwm2 man pages!)
Window Menu	
Move	Move window
Resize	Resize window
Iconify	Iconify window
Maximize/Normal	Maximize window, respective return to normal
(Un)Stick	Stick window to its position on a virtual desktop
Refresh	Refresh window
Raise	Raise window
Lower	Lower window
Next	Next window
Previous	Previous window
Window list	Display window list
Close	Close window
Kill	Kill window
Window Manager	
Restart Fvwm2	Restart window manager
Modules	
IconBox	(Please, refer to the fvwm2 man pages!)
IconMan	(Please, refer to the fvwm2 man pages!)
Ident	(Please, refer to the fvwm2 man pages!)

System tools

EOSinfo	Display release integrity status, please refer also to section 4.8.6 Release integrity utility (eosinfo) .
Event-Test	Start event monitor
Vi	Start vi text editor
Telnet	Start telnet client
Clocks	
Analog	Display analog clock
Digital	Display digital clock
Shells	
Bash	
Bash	Start bash shell
Big bash	Start big bash shell
Login bash	Start login bash shell
Tcsh	
tcsh	Start tcsh shell
Big tcsh	Start big tcsh shell
Login tcsh	Start login tcsh shell

4.6 Displaying video and RGB signals

Video and RGB signals can be displayed on an Barco display wall with the optional input cards QUAD ANALOG VIDEO CARD, DUAL DVI INPUT CARD, STREAMING VIDEO CARD, QUAD SDI VIDEO CARD and DUAL RGB INPUT CARD. Based on an extension library of the X server the Barco video client xvideo allows the convenient handling of analog video, streaming video and RGB signals.

Simultaneous operation

Multiple input cards can be operated simultaneously. In this case, the corresponding video windows may freely overlap. For larger display walls a system with multiple OMNIBus devices may be required. Large systems with freely movable video and RGB windows require the usage of a distributed system.

OmniScaler

Due to the dual color mode capability of the OMNISCALE, TRANSFORM A can display video and RGB signals in their native color mode e.g. YUV4:2:2 and 16 bit RGB TrueColor while the X Server operates in 8 bit PseudoColor mode with 256 colors. Please, refer to section [4.2 Color management](#) for more details.

One OMNISCALE provides the capability to process up to 128 video and RGB inputs simultaneously. Video and RGB data is triple buffered. Therefore only entire frames are displayed in sync with the graphical data to avoid frame tearing.

Backend scaling

The OMNISCALE is able to do backend scaling. Scaling the video data at the backend of data transfer chain (Input card -> PCI-Bus -> OMNISCALE) has its big advantage in a reduced need of PCI Bus bandwidth. Furthermore the OMNISCALE provides up-scaling capabilities until full-screen resolution and far beyond.

The backend scaling uses linear interpolation for calculating new pixels.

In standard configuration the X server, depending on the size of the video window and the type of the input card automatically controls the usage of backend scaling.

Dependant on the scaling factor either the OMNISCALE or the input card scales data. As soon as the size of the video or RGB window is larger than 1:1 the OMNISCALE scales data up to the displayed size. If the video is displayed in a lower resolution than 1:1, then the input card itself performs a downscaling, to reduce the need of bandwidth for the data transfer.

Module video

The QUAD ANALOG VIDEO CARD, DUAL DVI INPUT CARD, STREAMING VIDEO CARD, QUAD SDI VIDEO CARD and the DUAL RGB INPUT CARD also display videos and RGB signals respectively without borders and fitted to complete projection modules (1 to n×n, depending on configuration). The display is always »on top«, other applications are »behind« and can not be manipulated by accident. If the display is removed from the desktop (quit or iconified) all covered applications show up again immediately.



In a distributed system the display wall is controlled by multiple rendering machines. If a video shall be displayed on the display areas of multiple rendering machines, all concerned rendering machines must be supplied with the video signal.

Plain video mode

The plain video mode may be used in a system where only very few videos are displayed. In such systems it is possible to omit the OMNISCALERS. Video in plain video mode can not be upscaled and the color depth of the display is limited to the visual class TrueColor. Please refer also to section [6.1.13 Plain video mode](#).



In a distributed system plain video mode may also be restricted to a rendering machine.

Genlock

The TRANSFORM A system provides the ability for genlocking. Either a video channel of a QUAD ANALOG VIDEO CARD, of a STREAMING VIDEO CARD or a DUAL DVI INPUT CARD, the first video channel of a QUAD SDI VIDEO CARD, the clock of an UGX or AGX GRAPHIC CARD or an external studio signal can be used as reference signal. Basic functionality of genlock is accessible via the window manager, please refer to section [4.5 Window manager](#). Access to the complete genlock functionality is explained in section [4.8.8 Genlock utility](#).



Genlock is available in an OmniBus configuration only!

4.6.1 The input cards

For showing information from external sources like video or RGB data on a Barco display wall a set of input cards is provided. For integration of video the QUAD ANALOG VIDEO CARD, the QUAD SDI VIDEO CARD and the STREAMING VIDEO CARD is available and for RGB data the DUAL RGB INPUT CARD can be used. Multiple input cards can be inserted in one device of TRANSFORM A.

An X video application allows to display the sources connected to the input cards in individual windows on the display wall, that can be freely scaled and moved within the projection cubes connected to that device. The display options can be set in a dialog box.

Quad Analog Video Card

Four different VHS video sources can be connected to a QUAD ANALOG VIDEO CARD and displayed simultaneously.

Streaming Video Card SVC-1

The STREAMING VIDEO CARD is able to decode and simultaneously display the following formats and amount of video streams:

MPEG-1	up to 4 streams (all resolutions)
MPEG-2	up to 4 D1 streams or 4 CIF streams
MPEG-4 part 2	up to 4 CIF streams or 3 2CIF streams or 1-2 4CIF streams (if content is highly dynamic e.g. action movies, it is recommended to decode 1 4CIF stream per board)
MPEG-4 h263	up to 4 CIF streams or 4 2CIF streams or 4 4CIF streams
MJPEG	up to 4 CIF streams or 2-4 4CIF streams (AXIS: 4 CIF streams 75% quality/25% compression)
MxPEG	up to 4 CIF streams or 2 1280x576 streams
Visiowave	1-3 D1 streams or up to 4 CIF streams (depends on resolution)
TRANSFORM SCN	1 stream

All streams decoded by one card must have been encoded with the same compression algorithm.

Streaming Video Card SVC-2

The STREAMING VIDEO CARD is able to decode and simultaneously display the following formats and amount of video streams:

MPEG-2	up to 15 Mbps per stream
MPEG-4 part 2	up to 8 Mbps per stream
Visiowave	up to four streams

For each stream the STREAMING VIDEO CARD SVC-2 provides a dedicated DSP. Therefore any combination of the above mentioned compression algorithms can be decoded by one card simultaneously.

Quad SDI Video Card

Four different digital video sources can be connected to a single QUAD SDI VIDEO CARD and displayed simultaneously.

Dual RGB Input Card

The DUAL RGB INPUT CARD digitizes one or two analog monitor signals. It supports two monitor signals with a pixel frequency between 10 MHz and 135 MHz. The most common VESA timings are stored as presets. In addition, user defined timings can be saved. The timing and aspect ratio of the connected RGB signal are detected automatically.

The DUAL RGB INPUT CARD has an automated static frame rate reduction depending on number of the signals it processes, please see the table below.

	static frame rate reduction ¹⁾
two signals	1/3
one signal	1

Table 4-2
static frame rate reduction for RGB sources

The X video application allows selecting additionally a dynamic frame rate reduction of the source, which must be multiplied to the static frame rate reduction to obtain the overall frame rate reduction, please refer also to section [4.6.4 Displaying video and RGB signals](#).

Dual DVI Input Card

The DUAL DVI INPUT CARD processes one or two signals. These can be sources of multiple types: composite video or S-Video, analog or digital RGB sources or component video.

The most common VESA timings and HDTV timings are stored as presets for RGB sources and HDTV signals. In addition, user defined timings can be saved. The timing and aspect ratio of the connected signal is detected automatically.

The card provides two input modes: Dual input mode to display two signals simultaneously and single input mode for specially demanding sources. The mode is automatically switched depending on the signal that is applied at **In 1**. In single input mode the second input is not available.

	dual input mode	single input mode
In 1	analog signals up to 170 MHz pixel clock digital signals up to about 288 MHz pixel clock	analog signals up to 340 MHz pixel clock digital signals up to 330 MHz pixel clock
In 2	analog signals up to 170 MHz pixel clock digital signals up to 165 MHz pixel clock	– –

Table 4-3
Input modes of DUAL DVI INPUT CARD

The DUAL DVI INPUT CARD has an automated static frame rate reduction depending on number and type of the signals it processes, please see the table below.

	static frame rate reduction
signals ≤ 1280×720@60/50 Hz	1
signals between 1280×720@60/50 Hz and 1920×1080@60/50 Hz	1/2
signal > 1920×1080@60/50 Hz	1/4

Table 4-4
static frame rate reduction for Dual DVI Input Card

The X video application allows selecting additionally a dynamic frame rate reduction of the source, which must be multiplied by the static frame rate reduction to obtain the overall frame rate reduction.

Amount of video and RGB windows

The number of video and RGB data that can be processed in TRANSFORM A underlies the available bandwidth.

- In each OMNIBUS A18 there are 400 MBps available.
- In an OMNIBUS A12 the available bandwidth per card is usually at least 200 MBps depending on the overall configuration.
- In a Processor configuration the system (PROCESSOR and EXTENDER together) provides 100 MBps and a single PROCESSOR AGS-3390-2 provides 200 MBps respectively.

The following table gives an overview about the bandwidth required for some standard window sizes. In the last four columns there are in addition the maximal values for windows of that source type in the four different device types, OMNIBUS A18, input card in OMNIBUS A12, Processor configuration, and Processor AGS-3390-2. These values are valid, if only windows with the specified properties are displayed.

type	number of pixels	frame rate [fps]	color depth [bpp]	bandwidth per window [MBps]	max. amount of windows per			
					OmniBus A18	input card in OmniBus A12	Processor Configuration	Processor AGS-3390-2
NTSC	640×480	30	16	19	21	4 / 2 ^{2), 3)}	5	10
PAL/SECAM ¹⁾	720×540	25	16	20	20	4 / 2 ^{2), 3)}	5	10
HDTV 720p	1280×720	25	16	47	8	2 ²⁾	2	4
HDTV 720p	1280×720	30	16	56	7	2 ²⁾	1	3
HDTV 1080i	1920×1080	25	16	104	3	2 ²⁾	–	1
HDTV 1080i	1920×1080	30	16	125	3	2 ²⁾	–	1
XGA	1024×768	10	16	16	25	2	6	12
XGA	1024×768	15	16	24	16	2	4	8
XGA	1024×768	20	16	32	12	2	3	6
SXGA	1280×1024	10	16	27	15	2	3	7
SXGA	1280×1024	15	16	40	10	2	2	5
SXGA	1280×1024	20	16	53	7	2	1	3
UXGA	1600×1200	10	16	39	10	2	2	5
UXGA	1600×1200	15	16	58	6	2	1	3
UXGA	1600×1200	20	16	77	5	2	1	2
2K	2048×2048	10	16	84	4	1	1	2
2K	2048×2048	15	16	126	3	1	–	1
2K	2048×2048	20	16	168	2	1	–	1
XGA	1024×768	10	24	24	16	2	4	8
XGA	1024×768	15	24	36	11	2	2	5
XGA	1024×768	20	24	48	8	2 ²⁾	2	4
SXGA	1280×1024	10	24	40	10	2	2	5
SXGA	1280×1024	15	24	59	6	2	1	3
SXGA	1280×1024	20	24	79	5	2 ²⁾	1	2
UXGA	1600×1200	10	24	58	6	2	1	3
UXGA	1600×1200	15	24	87	4	2	1	2
UXGA	1600×1200	20	24	116	3	2 ²⁾	–	1
2K	2048×2048	10	24	126	3	1	–	1
2K	2048×2048	15	24	189	2	1	–	1
2K	2048×2048	20	24	252	1	1 ²⁾	–	–

Table 4-5
size of video/RGB data and number of displayable video windows in case that only this type of video window is displayed

- 1) SECAM only with QUAD ANALOG VIDEO CARD, DUAL DVI INPUT CARD and STREAMING VIDEO CARD
- 2) Overall configuration has to be considered
- 3) For QUAD ANALOG VIDEO CARD and DUAL DVI INPUT CARD respectively

To calculate the bandwidth for windows of different sizes or frame rates the following formula can be used:

$$B = res_x * res_y * fr * cd$$

The abbreviations have the following meaning:

- **res_x, res_y – resolution of the source in x- and y-direction in pixels**

It is important to consider the final scaling used to display the window. Up-scaling of the input sources is performed in the OMNISCALE therefore data is transferred 1:1 and the original resolution must be inserted into the formula. If the source is displayed smaller than 1:1 the source is downscaled directly in the input card. The original size of the different video types can be read from the table above.

- **fr – frame rate**

For video a frame rate of 25fps (PAL/SECAM) and 30fps (NTSC) is standard. For dynamic RGB input a frame rate of 20 fps in normal cases gives an acceptable performance. If the RGB-source is mostly static even lower frame rates can be selected.

- **cd – color depth**

For all video windows the color mode YUV 4:2:2 is used, which means the factor is

$$cd = 2$$

For RGB windows two different color modes may be useful, please refer to section [4.2.2 Color capabilities](#):

$$\text{Color mode} = \text{RGB 16 bpp} \quad cd = 2$$

$$\text{Color mode} = \text{RGB 24 bpp} \quad cd = 3$$

With the average bandwidth of the OMNIBus A12 of 200 MBps per input card the sum of the bandwidth demands of the windows provided by one input card should not be bigger than this value. Anyhow also higher bandwidth usage may be possible but the overall configuration should be considered (In case of doubt contact the Barco support; please refer to section [8.3 Hot line](#).) :

$$200 \text{ MBps} = B_1 + B_2 + \dots + B_n$$

With the effective bandwidth of the OMNIBus A18 of 400 MBps the sum of the bandwidth of the individual windows may not be bigger than 400 MBps to provide optimal performance:

$$400 \text{ MBps} = B_1 + B_2 + \dots + B_n$$

In a Processor configuration with 100 MBps the following correlation must be considered:

$$100 \text{ MBps} = B_1 + B_2 + \dots + B_n$$

With a single Processor **AGS-3390-2** with 200 MBps the following correlation must be considered:

$$200 \text{ MBps} = B_1 + B_2 + \dots + B_n$$



Bandwidth optimization for video and RGB windows:

All optimization settings are made by means of the X video client, please refer to the section [4.6.4 Displaying video and RGB signals](#).

Frame rate

For video sources there are two settings with different frame rate reduction factors selectable to optimize the bandwidth usage. For RGB sources the static reduction of the frame rate depends on the input mode and the dynamic frame rate reduction is selectable. (Use the **Fps** setting for video data and **Reduction** for RGB data respectively and refer to the subsection [Dual RGB Input Card](#) above)

Color depth

RGB sources can be digitized with 16 bpp or with 24 bpp (depending on the visual class of the X server).

4.6.2 The video channels

For digitalization of the analog, digital or streaming video data and of RGB sources, a hardware module (**adapter**) is necessary. Each video and RGB adapter offers one input (**port**). Accordingly, the QUAD ANALOG VIDEO CARD, the QUAD SDI VIDEO CARD as well as the STREAMING VIDEO CARD have four adapters with one port each and the DUAL DVI INPUT CARD and the DUAL RGB INPUT CARD have two adapters with one port each.

The TRANSFORM A system automatically creates video channels according to the available input adapters by simply assigning one channel per adapter in the order in which the input cards are inserted into the PCI slots of TRANSFORM A.



In a distributed system in addition the order of the rendering machines is considered when creating the numbers of the video channels.

In a monolithic system of an OmniBus configuration where input cards are located in multiple OMNIBus devices, the video display is restricted to the display area of the respective OMNIBus where the input card is plugged in.

In a distributed system video adapters of multiple rendering machines (one from each rendering machine) can be integrated to a »logical« video channel. A logical video channel can be displayed on the display area of all appendant rendering machines.

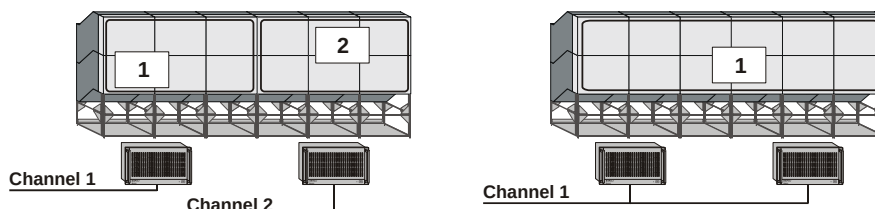


Figure 4-2
video input cards in different rendering machines
left: operated separately, right: as one logical channel



The configuration of logical video channels is done by means of the configuration script EOSconfig, please refer to section 3.4.3 [Configuring a distributed system](#). Additional background information about the configuration of logical video channels can be found in section 6.1.6 [Advanced configuration of Transform A](#).

4.6.3 The Xvideo client

For displaying videos and RGB signals on the display wall an X client is available. The client is called **xvideo** and handles all inputs from QUAD ANALOG VIDEO CARD, STREAMING VIDEO CARD, QUAD SDI VIDEO CARD and DUAL RGB INPUT CARD.

The video client **xvideo** can be started as follows:

```
# xvideo [-<option>]
```

After **xvideo** is started two windows show up: the **control panel** and the **canvas panel**. The control panel offers controls for customizing the display, whereas the canvas panel displays the video or RGB data. The video client detects automatically what kind of signal is connected to channel 1.

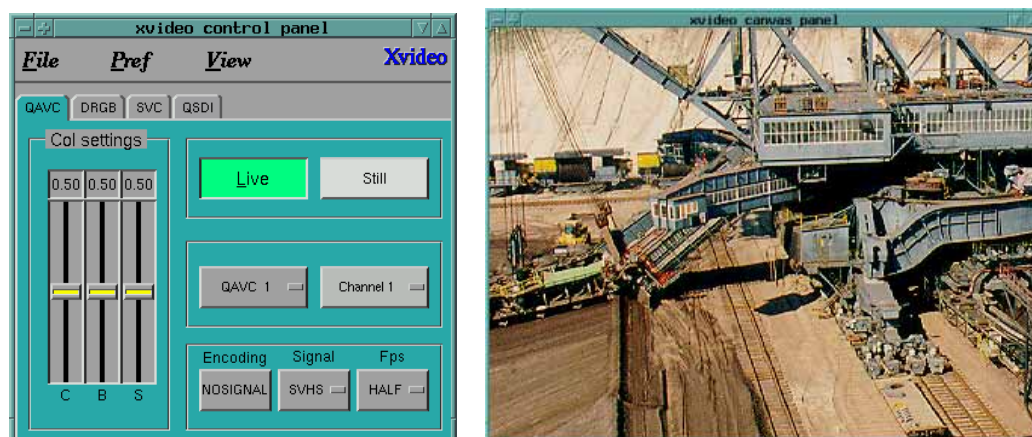


Figure 4-3
Xvideo client control and canvas panel

The video client offers up to four tabs for QUAD ANALOG VIDEO CARD, STREAMING VIDEO CARD, QUAD SDI VIDEO CARD and DUAL RGB INPUT CARD depending on the actual hardware configuration of your TRANSFORM A.

The options for starting the video client **xvideo** are listed in section 4.6.5 [The options](#). An important option is described below: Module Video and Module RGB.

Module video and module RGB

All input cards allow to start the video client **xvideo** with an option for displaying the input signal without borders and fitted to complete projection modules (1 to n×n, depending on configuration).

The command

```
# xvideo -mv 1 -mg 1x1+1+0
```

lets the video client start as Module Video (-mv 1) on the second projection module from the left in the upper row (-mg 1x1+1+0).

The displayed video or RGB signal is always »on top«, other applications are »beyond« and can not be manipulated by accident.

File menu

File	
Read ...	
Xvideo Config File ...	Read Xvideo configuration file
RGB Preset File ...	Read RGB preset file
SVC Stream Preset File ...	Read stream preset file
Save ...	
Xvideo Config File ...	Save Xvideo configuration file
RGB Preset File ...	Save RGB preset file
SVC Stream Preset File ...	Save stream preset file
Save As ...	

Xvideo Config File ...	Save Xvideo configuration file to another path or file name
RGB Preset File ...	Save RGB preset file to another path or file name
SVC Stream Preset File ...	Save stream preset file to another path or file name
Exit	Quit video client
Pref	
Save On Exit	Save/not save configuration on quitting the video client. With multiple logical screens the settings are saved per screen, therefore Save As ... Xvideo Config File ... should be used instead.
Canvas	Define position and size of Canvas Panel
RGB ...	
Set Remote Display	Opens a dialog to enter IP address and screen number of the screen that is connected to the current RGB channel
On/Off Remote Pointer	Switches the remote pointer ability of the above set screen on or off; i.e. the pointer of the TRANSFORM A can be used to operate the screen, displayed by the RGB channel
Map/Unmap Remote Keyboard	Maps or unmaps the remote keyboard; i.e. the keyboard of the TRANSFORM A can be used to operate the screen, displayed by the RGB channel (it is also switched to the country scheme of the keyboard)
SVC ...	
Board Settings	Define settings of a STREAMING VIDEO CARD
Stream Settings	Define settings of video streams
DDVI ...	
Read EDID Structure from DDVI	<i>Only applicable for DUAL DVI INPUT CARD:</i> reads EDID data from the EDID PROM and saves it to a file; please refer to section 4.6.4 Displaying video and RGB signals – Dual DVI Input Card
Write EDID Structure to DDVI	<i>Only applicable for DUAL DVI INPUT CARD:</i> reads EDID data from a file and writes it to the EDID PROM
Overscan ...	The edges of video often show disturbances; therefore an overscan of some 3% can be defined that will not be displayed. Not applicable with DUAL RGB INPUT CARD and source type 3, 4 of DUAL DVI INPUT CARD.
Set Default	Set the default value: 3% for video sources 0% for digital RGB (DVI).
Set Manual	Set a user defined overscan value between 0% and 10%
View	
Close Canvas Panel	Close canvas panel
Iconify Canvas Panel	Iconify canvas panel
Raise Canvas Panel	Raise canvas panel
Close Control Panel	Close control panel
Help	Display help in canvas panel

Table 4-6

A left mouse click in the canvas panel raises the control panel, another click dismisses it.



If no signal is connected to a video channel, the corresponding video window appears in background color. If a signal is connected later, the Channel, Port or Live button must be pressed.

Except from the control panel the video can be controlled by using short cut keys also. Information about the shortcut keys can be read in the help or in the table below:

Shortcut	Applicable for:	Meaning
b <up> <down>	QAVC, QSDI, SVC, DDVI, DRGB	increment/decrement brightness (red for DDVI source 3)
c <up> <down>	QAVC, QSDI, SVC, DDVI	increment/decrement contrast (green for DDVI source 3)
s <up> <down>	QAVC, QSDI, SVC, DDVI	increment/decrement saturation (blue for DDVI source 3)
r <up> <down>	DRGB	increment/decrement red
g <up> <down>	DRGB	increment/decrement green
l <up> <down>	DRGB	increment/decrement blue
SHIFT r	QAVC, QSDI, SVC, DDVI, DRGB	reset color selections
v <number>	QAVC, QSDI, SVC, DDVI, DRGB	select input card 1 . . n
h <number>	QAVC, QSDI, SVC	select input channel 1 . . 4
h <number>	DDVI, DRGB	select input channel 1, 2
SHIFT v	QAVC ¹	VHS
SHIFT s	QAVC ¹	S-VHS
p <number>	SVC, DDVI ² , DRGB	select preset 1 . . n
p a	DDVI ² , DRGB	auto preset selection
r	QAVC, QSDI, SVC	toggle frame rate between full and half frame rate
d	DDVI, DRGB	set reduction value 0 . . 255 for DDVI, 0 . . 15 for DRGB
f 0	QAVC, QSDI, SVC, DDVI, DRGB	select QUAD ANALOG VIDEO CARD folder
f 1	QAVC, QSDI, SVC, DDVI, DRGB	select DUAL RGB INPUT CARD folder
f 2	QAVC, QSDI, SVC, DDVI, DRGB	select QUAD SDI VIDEO CARD folder
f 3	QAVC, QSDI, SVC, DDVI, DRGB	select STREAMING VIDEO CARD folder
f 4	QAVC, QSDI, SVC, DDVI, DRGB	select DUAL DVI INPUT CARD folder
SHIFT l	QAVC, QSDI, SVC, DDVI, DRGB	live video
SHIFT i	QAVC, QSDI, SVC, DDVI, DRGB	still video
SHIFT t	QAVC, QSDI, SVC, DDVI, DRGB	stop video
SHIFT c	QAVC, QSDI, SVC, DDVI, DRGB	iconify canvas panel
SHIFT d	QAVC, QSDI, SVC, DDVI, DRGB	dismiss canvas panel
SHIFT h	QAVC, QSDI, SVC, DDVI, DRGB	toggle help menu
CTRL e	QAVC, QSDI, SVC, DDVI, DRGB	exit video client

Table 4-7

keyboard shortcuts to control video

QAVC = QUAD ANALOG VIDEO CARD, QSDI = QUAD SDI VIDEO CARD, SVC = STREAMING VIDEO CARD,
DDVI = DUAL DVI INPUT CARD, DRGB = DUAL RGB INPUT CARD

QAVC¹: QUAD ANALOG VIDEO CARD **FRG-3292** only

DDVI²: for source types 3, 4

4.6.4 Displaying video and RGB signals

Control Panel for Quad Analog Video Card

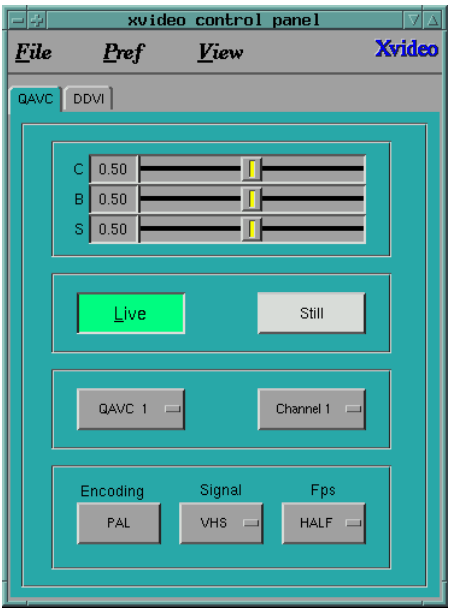


Figure 4-4
Xvideo control panel

C	Set contrast of video display
B	Set brightness of video display
S	Set saturation of video display
Live	Start video display
Still	Freeze video display
QAVC 1	Select video card (the cards can be renamed)
Channel 1	Select video channel of the QUAD ANALOG VIDEO CARD (max. 4 channels; the channels can be renamed)
Encoding	Shows the detected video standard (PAL, NTSC, SECAM)
Signal	Select recording standard (VHS – default, S-VHS), S-VHS only available with a QUAD ANALOG VIDEO CARD FRG-3292 .
Fps	Select the frame rate (FULL, HALF – default)

Table 4-8

Configuration of the video display

In the Control Panel you can adjust the video display regarding contrast, saturation and brightness etc.

The video client can store these settings as well as the selected video channel in a configuration file. From the **File** menu you can choose to save the current configuration or read in other.

A certain configuration file can also be invoked as an option on the command line when starting the video client. Please, refer to section [4.6.5 The options](#).

Control Panel for Streaming Video Card



Figure 4-5
Xvideo control panel – STREAMING VIDEO CARD SVC-1 (left) and STREAMING VIDEO CARD SVC-2 (right)

C	Set contrast of video display <i>(not available, if an scn_dec stream is selected)</i>
B	Set brightness of video display <i>(not available, if an scn_dec stream is selected)</i>
S	Set saturation of video display <i>(not available, if an scn_dec stream is selected)</i>
Live	Start video display
Still	Freeze video display
SVC-X Y	Select video card (the cards can be renamed). The list distinguishes between type SVC-1 and SVC-2. Nevertheless the index Y is numbered continuously.
Channel 1	Select video channel of the STREAMING VIDEO CARD (max. 4 channels, with scn_dec as compression algorithm only 1 channel available; the channels can be renamed)
Stream	Assign a video stream to the selected channel, please refer also to section Configuring Streaming Video Card and Configuring video streams below. As soon as a stream has been selected the name of the stream instead of Stream is shown in the button.
Codec	Shows the configured compression algorithm (SVC-1) and codec configuration (SVC-2) respectively
Encoding	Shows the detected video standard (PAL, NTSC)
Fps	Select the frame rate (FULL, HALF – default)

Table 4-9

Configuring Streaming Video Card

For each STREAMING VIDEO CARD once the configuration parameters must be entered into the **SVC Settings** dialog, therefore select **SVC Pref ... -> Board Settings** from the **File** menu; please refer to section 4.6.3 The Xvideo client.

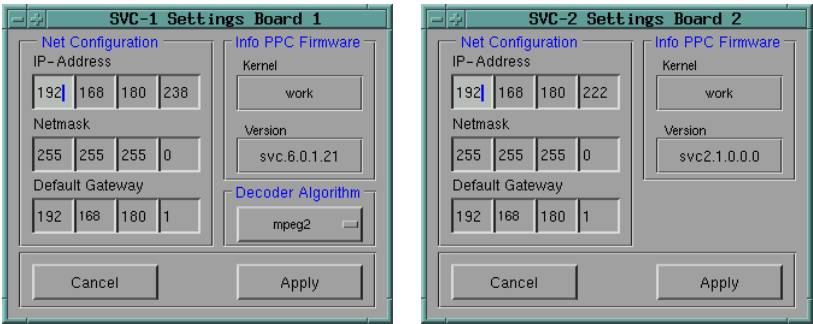


Figure 4-6
SVC Settings dialog of the STREAMING VIDEO CARD – STREAMING VIDEO CARD SVC-1 (left) and STREAMING VIDEO CARD SVC-2 (right)

Network Configuration	
IP-Address	IP address of the STREAMING VIDEO CARD. Each STREAMING VIDEO CARD needs its own, fixed IP address
Netmask	Netmask of the STREAMING VIDEO CARD, must be the same value for all cards
Default Gateway	Gateway, must be the same value for all cards. Even if the network does not require an indication of the Gateway, a value must be filled in.
Decoder Configuration	
Algorithm	Only for SVC-1: All video streams processed by one STREAMING VIDEO CARD SVC-1 must have the same compression algorithm. Currently the compression algorithms h263 , mjpeg , mpeg2 , mpeg4_sp , mxpeg , scn_dec , visiowave , vnc are supported.

Table 4-10

Configuring video streams

The parameters of a video stream must be defined in the **SVC Stream Params Editor**, before the STREAMING VIDEO CARD can display it. Once defined it is available for every STREAMING VIDEO CARD in the system. To open the **SVC Stream Params Editor** select **SVC Pref ... -> Stream Settings** from the **File** menu, please refer to section 4.6.3 [The Xvideo client](#).

Pressing the **Add** button adds a new stream with the entered name into the **Streams** list. The parameters that are displayed at that time are saved together with it. If there exists already an entry with the same name then its parameters are not changed. Pressing the **Apply** button applies the displayed parameters to the hardware. In that way changes can be controlled directly. Pressing the **OK** button applies the parameters to the hardware and to the system. Pressing the **Cancel** button closes the window, anyhow changes that are already confirmed with the **Add** or **Delete** button can not be revoked.

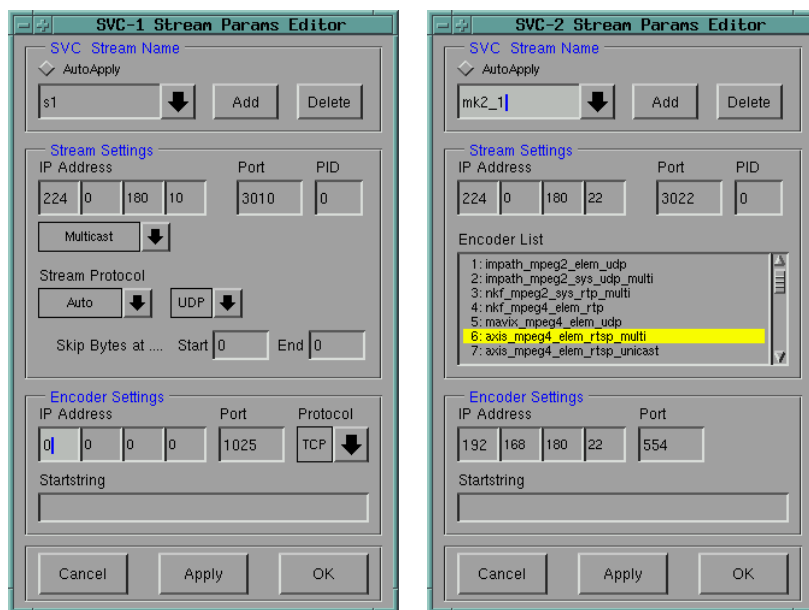


Figure 4-7

SVC Stream Params Editor of the STREAMING VIDEO CARD – STREAMING VIDEO CARD SVC-1 (left) and STREAMING VIDEO CARD SVC-2 (right)

SVC Stream Name	A list of all video streams in alphabetic order	
Stream Settings		
IP Address	IP address of the video stream	
Port	Encoder port, appendant to the IP address.	
PID	Should be entered for transport streams when the PAT (program allocation tables) or PMT (program map tables) are not sent. 0 is a predefined value. It causes an auto-search for the video PID. If no valid PID is found no video will be shown.	
<i>Only for SVC-1:</i>		
IP Address ...	select the type of the forwarding method (unicast , broadcast or multicast) when multicast is selected also the multicast IP address must be specified	
Stream Protocol	auto	Auto-detection of the stream protocol
	elementary	Elementary stream
	program	Program stream
	transport	Transport stream
IP Protocol	Selection of the used IP protocol. (firmware < 2.0 of the STREAMING VIDEO CARD only supports udp) RTP and UDP are selectable	

Skip bytes at ...	
Start	Encoder dependant value of the number of bytes that must be skipped at the beginning
End	/ end of each packet, please see table below.
<i>Only for SVC-2:</i>	
Encoder List	List with the available encoder configurations
Encoder Settings	This section contains data that is used, if initial communication with the encoder is needed to prompt the encoder to send a stream. All fields must be filled in!
IP Address	IP address of the encoder; may only be filled in if TCP has been selected for IP Protocol
Port	Port where the encoder listens to TCP start commands; may only be filled in if TCP has been selected for IP Protocol
IP Protocol	<i>Only for SVC-1:</i> Should remain udp , as indicated in the section Decoder control above. Only if a communication with the encoder is required, tcp should be selected.
Startstring	String that is sent to the specified encoder

Table 4-11
Parameters on the SVC Stream Params Editor



As unicast streams are only sent to one single IP address, only one Streaming Video Card at a time is able to display one particular unicast stream.

The following table lists the encoder specific values that must be entered into the **Streams Params Editor**. They are valid with STREAMING VIDEO CARD SVC-1 with firmware 6.0.1.21.

Encoder manufacturer – type	compression algorithym	IP protocol	Skip bytes at start	Skip bytes at end	Stream protocol	TCP	PID
AXIS –	mjpeg	TCP	0	0	auto	ON	0
206	Use port 80 for TCP and indicate the encoder IP address; signaling method is http; signaling is supported.						
206M	Startstring example:Axis241Q://GET /axis-cgi/mjpg/ ↳ video.cgi HTTP/1.0\n\n Resolutions with 1280 horizontal pixels are not supported.						
207 / 207W / 210 / 210A / 211 / 211A / 213 PTZ / 214 PTZ / 216FD / 225FD / 231D / 231D+ / 232D / 232D+ / 241S / 241SA / 242S IV	Startstring example:Axis241Q://GET /axis-cgi/mjpg/ ↳ video.cgi HTTP/1.0\n\n						
221	Startstring example:Axis241Q://GET /axis-cgi/mjpg/ ↳ video.cgi HTTP/1.0\n\n Up to 30 frames/sec						
240Q	Startstring example:Axis241Q://GET /axis-cgi/mjpg/ ↳ video.cgi?camera=1 HTTP/1.0\n\n						
241Q / 241QA	Startstring example:Axis241Q://GET /axis-cgi/mjpg/ ↳ video.cgi?camera=1 HTTP/1.0\n\n A maximum use of 4 4CIF streams with a maximum quality of 75% (or at least 25% compression) is recommended.						
Barco – TransForm SCN	scn	UDP	0	0	auto	OFF	0

Encoder manufacturer – type	compression algorithm	IP protocol	Skip bytes at start	Skip bytes at end	Stream protocol	TCP	PID
BOSCH – NWC-0455 Dinion / NWC-0455 DinionXF / VideoJet8008 / VIP X1 / VIP X1600 / VIP X2	h263	RTP	0	0	auto	ON	0
No on-board RCP+ support; I-frame distance may not be 0. Startstring example:VIP X							
BOSCH – Videojet 10 / Video- jet 1000 / Videojet Xpro / VIP 10 / VIP 1000	h263	RTP	0	0	auto	OFF	0
No on-board RCP+ support; I-frame distance may not be 0.							
BOSCH – Videojet 1000 / Video- jet 8000 / Videojet Xpro / VIP 1000	mpeg2	RTP	4	0	auto	OFF	0
No on-board RCP+ support.							
Cieffe – NETTUNO	mpeg4	UDP	0	0	auto	OFF	0
Coretec – VCX-2400-E	mpeg2	UDP	0	0	auto	OFF	0
Cornet – iVDO Streamer 2/4 Encoder	mpeg2	UDP	0	0	auto	OFF	0
Cornet – iVDO Streamer 2/4 Encoder	mpeg4	RTP	0	0	auto	OFF	0
DVTeL – 7601e	mpeg4	RTP	0	0	auto	ON	0
Use port 3000 for TCP, Startstring example: SmartSight							
Exterity – A/V server	mpeg2	RTP/UDP	0 / 4	0	auto	OFF	0
IP protocol: for Transport/UDP = UDP for Transport/RTP and Elementary = RTP SkipAtStart: for Elementary = 4, else = 0							
GE Security (Visiowave) – Discovery 2400 / Discovery 300 (Visiobox) / Evolution HD	2D wavelet	UDP	0	0	auto	ON	0
Use the encoder TCP port for TCP, Startstring example: Visiobox Signaling method is TCP, signaling is supported.							
HaiVision – Hai210	mpeg2	UDP	0	0	auto	OFF	0
Hi Tron – e-Videoserver	mpeg4	RTP	0	0	auto	OFF	0
No usage of Advanced simple profile. Encoder must be set to “Send to (Client) IP”							
iMPath – i1000	mpeg2	UDP	0	0	auto	OFF	0
iMPath – i4000	mpeg2	RTP/UDP	0	0	auto	OFF	0
RTP or UDP has to be configured in accordance with the encoder configuration.							
IndigoVision – VideoBridge™ 8000 881 / 8000 882	mpeg4	TCP	0	0	element.	ON	0
Use port 49500 for TCP; for each encoder the streaming port must be different. TCP is enabled without sending a string. The Barco Indigovision interface tool is required for the streaming!							
IndigoVision – VideoBridge™ 8000 882	mpeg4	RTP	0	0	auto	OFF	0
The Barco Indigovision interface tool is required for the streaming!							
JVC – VN-C655U	mjpeg	UDP	0	0	auto	OFF	0
Software viewer is needed to start the multicast stream and for keep-alive.							
LANACCESS – onSafe MPEG2	mpeg2	RTP	0	0	auto	OFF	0
LANACCESS – onSafe MPEG4	mpeg4	-	-	-	-	OFF	-

Encoder manufacturer – type	compression algorithm	IP protocol	Skip bytes at start	Skip bytes at end	Stream protocol	TCP	PID
Lenel – Network vido recorder	mjpeg	UDP	0	0	auto	OFF	0
	TCP is not enabled for the Streaming video card.						
Mavix – MediaRacer 100 / MediaRacer 150	mpeg2	UDP	12	0	auto	ON	0
	Multiple ports for TCP possible, Startstring: Mavix						
Mavix – MediaRacer 100 / MediaRacer 150	mpeg4	UDP	12	0	auto	ON	0
	Multiple ports for TCP possible, Startstring: Mavix						
Mobotix – D10Di-FixDome / M22	mxpeg	UDP	0	0	auto	ON	0
	Startstring: Mobotix://GET /control/faststream.jpg? ↳ stream=MxPEG&fps=25.000 HTTP/1.0\n\n Signaling method is HTTP, signaling is supported. The stream is a unicast stream. Resolutions up to 1280×576 supported.						
NiceVision (Fast Video Security) – ENC 8M2	mpeg2	RTP	4	0	auto	OFF	0
NiceVision – Recorder Pro	mpeg4	RTP	0	0	auto	OFF	0
	Only CIF resolution, only I and P frames are used. No successive Video Object Plane (VOP) start markers without data (used in recorded streams); Stream must be multicasted and always available on the network (no stream setup signaling required).						
Optelecom-NKF – c15 / c20 / CS20	mpeg2	RTP	0	0	auto	OFF	0
	The Ethernet interfaces must be set to Forced 100 Mbps Full Duplex , when con- necting to an NKF Switch.						
Optibase – MGW3100	mpeg2	–	–	–	auto	OFF	–
Path 1 – Cx 1800	mpeg2	UDP	0	0	auto	OFF	0
Pelco – PelcoNet NET350	h263	RTP	0	0	auto	OFF	0
	I-frame distance may not be 0.						
Pelco – PelcoNet NET4001A	mpeg2	RTP	4	0	auto	OFF	0
	No on-board RCP+ support.						
Pelco – PelcoNet NET4001A	h263	RTP	0	0	auto	OFF	0
	No on-board RCP+ support; limited frame rate.						
Siemens OTN – MVIDIP	mpeg2	–	–	–	–	OFF	–
Siemens OTN – MVIDIP	mpeg4	RTP	0	0	auto	OFF	0
Tandberg – E5710	mpeg2	–	–	–	–	OFF	–
Tandberg – Mediaplex-20	mpeg2	UDP	0	0	auto	OFF	0
Tandberg – TT6120	mpeg2	UDP	0	0	auto	OFF	0, 1, ...
	Generates multiple-program transport streams (MPTS). The Video PID is used to select the program.						
Tandberg – TT7116	mpeg2	UDP	0	0	auto	OFF	590

Encoder manufacturer – type	compression algorithm	IP protocol	Skip bytes at start	Skip bytes at end	Stream protocol	TCP	PID
Teleste – EASI BLUEbox / EASI IPET1 / EASI IPET3 / EASI MoRIS	mpeg2	UDP	0	0	auto	OFF	0
Teleste – EASI MoRIS / EASI MPC-E1 / EASI MPC- E2 / EASI MPC-E4 / EASI MPX-E8	mpeg4	RTP	0	0	auto	OFF	0
Telindus – Cellstack Centauri	mpeg2	RTP	0	0	auto	OFF	0
VBrick – VB4000 / VB6000	mpeg2	UDP	0	0	auto	OFF	0
	ISMA features not supported.						
VBrick – VBXcast 9140-4200 / VBXcast 9140-4300	mpeg4	UDP	12	0	auto	OFF	0
	ISMA features not supported.						
Verint – S1500e / S1600e-T	mpeg4	RTP	0	0	auto	ON	0
	Startstring example: SmartSight Only with encoder firmware 3.20 build 444. Usage of S1700e recommend.						
Verint – S1700e	mpeg4	RTP	0	0	auto	ON	0
	startstring example: SmartSight						
VideoLAN – VideoLAN (VLC/VLS)	mpeg2 mpeg4 mjpeg	see below:	0	0	auto	OFF	0
	For IP protocol multicast, unicast, UDP or RTP is possible.						
Vorex – VON v1.0	mpeg2 mpeg4	UDP	0	0	auto	OFF	0
	Decoding of AES streams is not supported.						

Table 4-12
Encoder dependant parameter values



For some encoders the settings are not defined, if there are difficulties to set them, please contact the Barco support, see section [8.3 Hot line](#).

Control Panel for Quad SDI Video Card

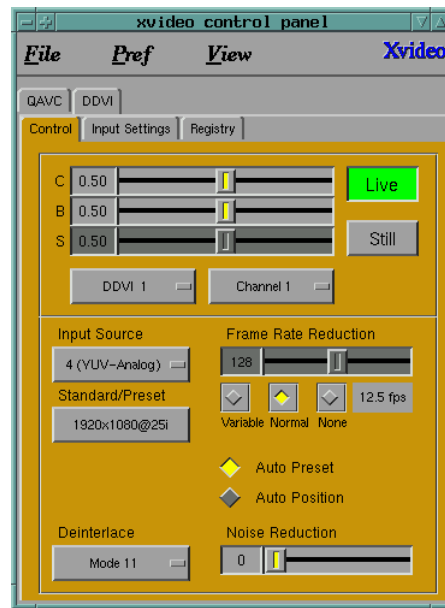


Figure 4-8
Xvideo control panel

C	Set contrast of video display
B	Set brightness of video display
S	Set saturation of video display
Live	Start video display
Still	Freeze video display
QSDI 1	Select video card (the cards can be renamed)
Channel 1	Select video channel of the QUAD SDI VIDEO CARD (max. 4 channels; the channels can be renamed)
Encoding	Shows the detected video standard (PAL, NTSC)
Fps	Select the frame rate (FULL, HALF – default)

Table 4-13

Control panel for Dual DVI Input Card

Figure 4-9
Xvideo control panel**Control****C / R**

Set contrast (source type 1, 2, 4, 5) / red (source type 3) of video display

B / G

Set brightness (source type 1, 2, 4, 5) / green (source type 3) of video display

S / B

Set saturation (source type 1, 2) / blue (source type 3) of video display

Live

Start video display

Still

Freeze video display

DDVI 1

Select one DUAL DVI INPUT CARD (the cards can be renamed)

Channel 1

Select video channel of the DUAL DVI INPUT CARD (max. 2 channels; the channels can be renamed)

Input Source

0 (Disabled) Video channel disabled
1 (Composite) Enable composite video signal
2 (S-Video) Enable S-Video signal
3 (RGB-Analog) Enable analog RGB signal
4 (YUV-Analog) Enable analog component video signal
5 (RGB-Digital) Enable DVI-D signal

Standard/Preset

Current timing or preset is indicated in the button.
 Only selectable, if **Auto Preset** is not enabled and for source types **3, 4**:
 Select a timing

Deinterlace

Setting of de-interlacing mode for interlaced sources:
 (5 different modes are available. They should be selected depending on the content of the displayed video.)

Mode 12 PC mode**Mode 13** film mode**Mode 14** sport**Mode 15** advanced**Mode 16** auto-selection of one of the four modes above

Frame Rate Reduction	Setting of the dynamic reduction factor of the frame rate. The static frame rate reduction, which is determined by the input mode (please refer to section 4.6.1 The input cards (Dual DVI Input Card)) can additionally be reduced by this factor. slider bar Range from 0 .. 255 determines the dynamic reduction factor $f(x) = (256-x)/256$, f(0) = 1 i.e. no further reduction f(255) = 1/256 i.e. maximal reduction. The value x is shown when clicking on the slider, the resulting frame rate is displayed next to the None radio button. Variable Slider bar is enabled Normal Default None Input frame rate is used, if possible
Auto Preset	Activate the auto-detect of source timing settings. Only with source type 3, 4. In case of a signal loss a blue window is displayed and the string no signal is shown within the Presets instead of the before used timing.
Auto Position	Activate auto-detect of source position. Only with source type 3.
Noise Reduction	Noise reduction in the range of 0 to 16: 0 – no noise reduction 1 – most modest level of noise reduction 16 – maximum value Optimal noise reduction has to consider the content of the displayed source.

Table 4-14



The **Input Settings** and **Registry** tab is only available for sources of type **3 (RGB analog)** or type **4 (YUV-analog)**. These tabs are the same like for RGB sources of the DUAL RGB INPUT CARD. For configuration of these source types please refer to the respective explanation below.

EDID Prom and DDC

EDID data (Extended Display Identification Data) can be loaded to the DUAL DVI INPUT CARD to provide DDC data for the connected image source generator, e.g. the graphic card of a computer that is connected to an input of the DUAL DVI INPUT CARD.

By default the DUAL DVI INPUT CARD uses 1024x768@60Hz as DDC timing. To adapt the DDC timing, select the entry **Write EDID Structure to DDVI** from the file menu of the control panel (see section 4.6.3 The Xvideo client). The available EDID files are stored under the following path:

/opt/MMT2686/etc/xvideo/edid/<filename>

The names of the EDID files each start with Edid followed by the timing they contain, e.g.:

Edid1024x768@60Hz.bin

In case that you want to check which EDID file is currently stored in the EDID prom, you can use the **Read Edid Structure from DDVI** entry from the file menu.

EDID data may be helpful when connecting RGB or component video sources to the DUAL DVI INPUT CARD.



When changing the EDID timing, it is immediately available at the input connector. Anyhow depending on the connected source generating device, it may be necessary to unplug and replug the data cable or even to reboot the source generating system.

Control panel for Dual RGB Input Card

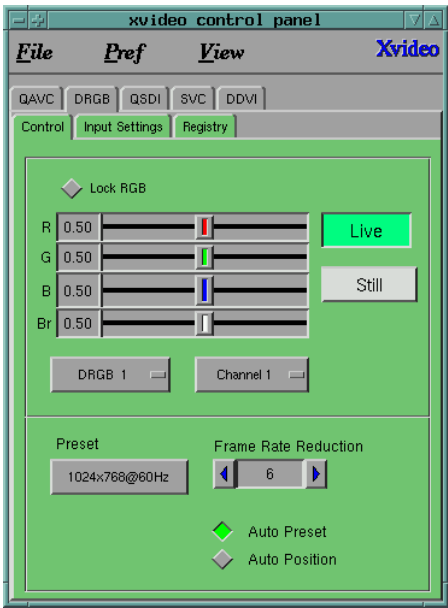
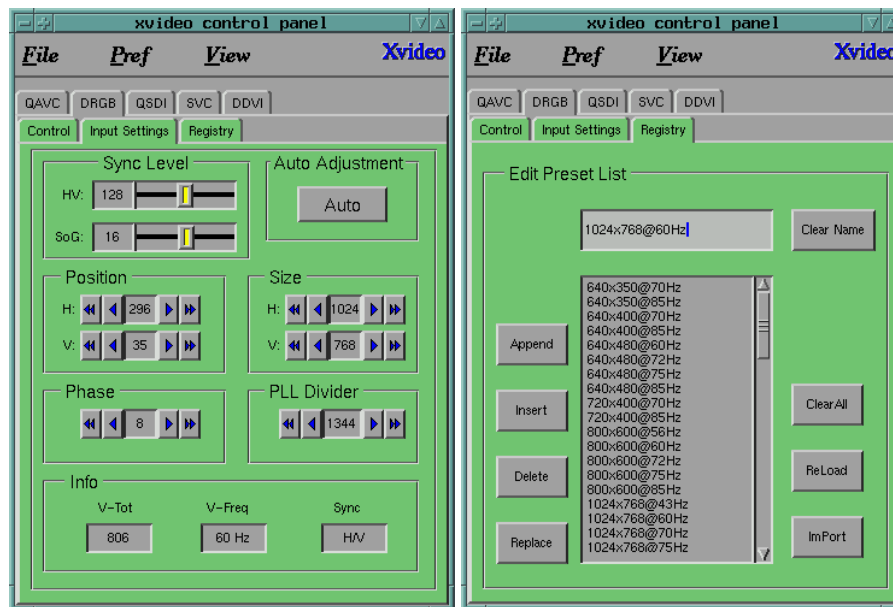


Figure 4-10
Xvideo control panel

Control	
Lock RGB	Change red, green and blue components together
R	Intensity of red component
G	Intensity of green component
B	Intensity of blue component
Br	Brightness
Live	Start the RGB display.
Still	Freeze the RGB display.
DRGB 1	Select one DUAL RGB INPUT CARD (the cards can be renamed)
Channel 1	Select video channel of the DUAL RGB INPUT CARD (max. 2 channels; the channels can be renamed)
Preset	Select a timing (current timing is indicated in the button)
Frame Rate Reduction	Set the dynamic reduction factor of the frame rate; range (0, 1, 2, ... , 15) The static frame rate reduction, determined by the input mode (please refer to section 4.6.1 The input cards (Dual RGB Input Card) can additionally be reduced by this factor 0: sets dynamic part of frame rate reduction to 1, best quality; 4: sets dynamic part of frame rate reduction to 1/2; 6: sets dynamic part of frame rate reduction to 1/3; 15: sets dynamic part of frame rate reduction to 1/15, best performance
Auto Preset	Activate the auto-detect of source timing settings. In case of a signal loss a blue window is displayed and the string no signal is shown within the Presets instead of the before used timing.
Auto Position	Activate auto-detect of source position

Table 4-15

**Input Settings****Sync Level**

Determine the sync level of the signal

HV: tuning the horizontal/vertical sync level

SoG: tuning the Sync on Green level

Auto Adjustement

Auto adjustment of source

Position

Position display area of visible RGB signal in the Canvas Panel

H: horizontal position of first active pixel (in steps of two)

V: vertical position of first active line

Size

Determine size of visible RGB signal

H: number of active pixels per line (in steps of four)

V: number of active lines

Phase

Tune phase shift of ADC

PLL Divider

Determine pixel frequency of RGB input

Info

Information about input signal

V_Tot: number of lines

V_Freq: frame rate

Sync: mode of synchronization

Registry**Clear Name**

Clear text box, which displays name of current preset

Append

Current setting is added to the list of presets

Insert

Current setting is inserted in the list of presets (before the highlighted preset)

Delete

Delete highlighted preset

Replace

Replace highlighted preset by current setting

Clear all

Delete all listed presets

Reload

Reload preset file and discard changes

Import

Add all highlighted presets to list of presets

Add

Clear selection

Clear Select**Dismiss**

Dismiss dialog box

Figure 4-11



If the applied signal changes while adjusting the settings, then a warning message appears, please see below. You can change to the control tab and select an appropriate timing for the new signal (click YES).



It is also possible, that the system detects a new timing, if the settings have been displaced too much. In this case click NO and readjust the settings again.

Configuration of RGB input

The video client is pre-configured for displaying most common VESA-timings. Since most monitor signals differ slightly from the VESA-timings, the user can adjust the pre-configured modes to the provided monitor signals. Also additional timings can be entered and stored as new presets.

For configuring the DUAL RGB INPUT CARD it is useful to have a suitable test pattern, basically thin black and white vertical lines:

**Windows 95/98/NT,
Macintosh,
PowerMacintosh
Sun Workstation**

Others

Switch desktop pattern to alternating, one pixel wide, black and white vertical lines

In console window (`cmdtool`) enter `xsetroot -mod 4 4`,
(enter `xsetroot -mod 4 4` for removing the pattern again)
Display text, which contains many **HHHHHHH**.

Table 4-16

Adjusting the preset

- Set up a suitable test pattern on the connected computer.
- Start the video client `xvideo`.
- Select the input channel in the **Control** tab (**Channel 1** or **Channel 2**).

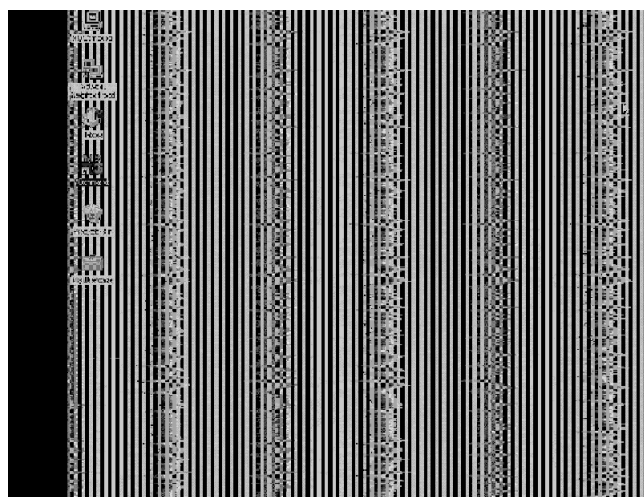


Figure 4-12
Configuring RGB input

If you want to display a source only once, so that there is no benefit in saving the input settings, the fastest way is to have the options **Detect Signal** and **Detect Pos** enabled. Please note that **Detect Pos** performs a visible adaptation cycle each time the signal changes. If you want to avoid this, please use the procedure below.

If you want to adapt the settings with the possibility to save them in a preset, do the following:

- Switch to the **Input Settings** tab and press **Auto**. This will automatically detect the source and set the right preset.
- If necessary switch to the **Input Settings** tab and tune **PLL Divider** (approx. $1.3 \times$ horizontal size) until the test pattern is displayed correctly.
- Align the display within the window with **Position**.
- If necessary tune **Phase** until the test pattern is displayed without flicker.

Managing the presets

As already mentioned a set of presets is pre-configured in the video client. These presets are stored in a preset file. The current preset file can be modified in the **Registry** tab, i. e. you can replace an existing timing by your own settings or add these to the list of timings.

The video client can handle more than one preset file. From the **File** menu you can choose to save the current preset file or read in another.

A certain preset file can also be invoked as an option on the command line when starting the video client. Please, refer to section [4.6.5 The options](#).

Configuration of the RGB display

Back in the **Control** tab you can adjust the RGB display regarding red, green, blue and brightness etc.

The video client can store these settings as well as the selected RGB channel and preset in a configuration file. From the **File** menu you can choose to save the current configuration or read another.

A certain configuration file can also be invoked as an option on the command line when starting the video client. Please, refer to section [4.6.5 The options](#).

4.6.5 The options

The video client accepts the following options on the command line. The **options** are listed together with their respective **arguments** and **default** values, and a short description.

Options concerning control panel

option	argument meaning	default
-name	string changes application name and allows to specify a certain resource file	none
-display	string specifies remote host	\$DISPLAY
-ctrlTitle -clt	string determines the window title of the xvideo control panel	xvideo control panel
-ctrlGeom -clg	geometry specifies position and size of the xvideo control panel	+50+100
-ctrlVisible -clv	0, 1 shows (1) or hides (0) the xvideo control panel	1
-ctrlIconic -cli	0, 1 iconifies (1) or resizes (0) the control panel	0
-followMouse -fm	0, 1 starts the control panel at the standard position (0) or at the position of the mouse pointer (1)	1
-activeGrabber -ag	4, 5, 6, 7, 8 selects QUAD ANALOG VIDEO CARD (4), DUAL RGB INPUT CARD (5), QUAD SDI VIDEO CARD (6), STREAMING VIDEO CARD (7) or DUAL DVI INPUT CARD (8)	

Table 4-17

Options concerning module video and module RGB

option	argument meaning	default
-moduleVideo -mv	0, 1 (1) video is displayed as Module Video, RGB signals as Module RGB	0
-moduleGeometry -mg	geometry determines layout of Module Video and Module RGB	

Table 4-18

Options concerning canvas panel

option	argument meaning	default
-canvasDisplay -cvd	string specifies another remote host for video display	same as <code>-display</code> or <code>\$DISPLAY</code>
-canvasTitle -cvt	string determines the window title of the canvas panel	xvideo canvas panel
-canvasGeom -cvg	geometry specifies position and size of the canvas panel	768x576+450+100
-canvasBackground -cvbg	color name Specifies the background color of the canvas panel. To specify a color a name defined in the file <code>rgb.txt</code> in the folder <code>usr/X11RELEASE6/lib/X11/rgb.txt</code> must be used.	blue
-canvasIconic -cvi	0, 1 iconifies (1) or resizes (0) the canvas panel	0
-allowResize -cvar -ar	0, 1 enables (1) interactive resizing of the canvas panel	1
-ratioAspect -cvra -ra	0, 1 restricts (1) re-sizing of the canvas panel to constant ratio of width and height of the video	1
-noBorder -cvnb -nb	0, 1 starts the canvas panel with (0) or without (1) border	0

Table 4-19

Options concerning Quad Analog Video Card

option	argument meaning	default
-qavRecording -qavre	VHS, SVHS selects the recording standard (SVHS only effective with model FRG-3292-0)	VHS
-qavRefreshRate -qavrr	1, 2 selects full (2) or half (1) refresh rate	1
-qavContrast -qavco	0.0 .. 1.0 determines the start value of contrast	0.5
-qavBrightness -qavbr	0.0 .. 1.0 determines the start value of brightness	0.5
-qavSaturation -qavsa	0.0 .. 1.0 determines the start value of saturation	0.5
-qavBoardNumber -qavbn	1 .. 64 selects the video card	1
-qavBoardChannelNumber -qavbc	1..4 selects the video adapter on the card	1
-qavDirtyEdges -qavde	0.0 .. 10.0 percentage of cut-off for overscan	3.0
-qavPlayMode -qavpm	Live, Still selects display mode	Live

Table 4-20

Options concerning Streaming Video Card

option	argument meaning	default
-mpgPresetName -mpgpn	filename selects a streaming video preset by specifying the presets name	impath1
-mpgPreset -mpgpr	1..n selects a streaming video preset by specifying the number that represents its order in the alphabetic list of all streaming video presets	
-mpgRefreshRate -mpgrr	1, 2 selects full (2) or half (1) refresh rate	1
-mpgContrast -mpgco	0.0 .. 1.0 determines the start value of contrast	0.5
-mpgBrightness -mpgbr	0.0 .. 1.0 determines the start value of brightness	0.5
-mpgSaturation -mpgsa	0.0 .. 1.0 determines the start value of saturation	0.5
-mpgBoardNumber -mpgbn	1 .. 64 selects the video card	1
-mpgBoardChannelNumber -mpgbc	1..4 selects the video channel on the card	1
-mpgDirtyEdges -mpgde	0.0 .. 10.0 percentage of cut-off for overscan	3.0
-mpgPlayMode -mpgpm	Live, Still select display mode	Live

Table 4-21

Options concerning Quad SDI Video Card

option	argument meaning	default
-qsdiRefreshRate -qsdirr	1, 2 selects full (2) or half (1) refresh rate	1
-qsdiContrast -qsdicto	0.0 .. 1.0 determines the start value of contrast	0.5
-qsdiBrightness -qsdiibr	0.0 .. 1.0 determines the start value of brightness	0.5
-qsdiSaturation -qsdisa	0.0 .. 1.0 determines the start value of saturation	0.5
-qsdiBoardNumber -qsdiibn	1 .. 64 selects the video card	1
-qsdiBoardChannelNumber -qsdiibc	1..4 selects the video adapter on the card	1
-qsdiDirtyEdges -qsdiide	0.0 .. 10.0 percentage of cut-off for overscan	3.0
-qsdiPlayMode -qsdiipm	Live, Still selects display mode	Live

Table 4-22

Options concerning Dual DVI Input Card

option	argument meaning	default
-ddviInputSignal -ddviis	0 .. 5 0 – input switched off 1 – Composite 2 – S-Video 3 – RGB-Analog 4 – YUV-Analog 5 – RGB-Digital	3
-ddviRed -ddvire	0.0 .. 1.0 determines the start value of red or of the contrast	0.5
-ddviGreen -ddvigr	0.0 .. 1.0 determines the start value of green or of the brightness	0.5
-ddviBlue -ddvibl	0.0 .. 1.0 determines the start value of blue or of the saturation	0.5
-ddviPreset -ddvipr	1 .. n Determine preset as line number in preset file	1
-ddviReduction -ddvird	0 .. 255 determine the reduction rate	128
-ddviNoiseReduction -ddvinr	0 .. 16 determine the level of noise reduction	0
-ddviDeinterlaceMode -ddvidm	1 .. 5 determine the deinterlace mode: 1 – PC 2 – film 3 – sport 4 – advanced 5 – auto selection	5
-ddviDownloadEdid -ddvidle	<filename> writes from /opt/MMT2686/etc/xvideo/edid/<filename> the edid structure to the DUAL DVI INPUT CARD	
-ddviUploadEdid -ddviule	<filename> writes current edid structure from DUAL DVI INPUT CARD to /opt/MMT2686/etc/xvideo/edid/<filename>	
-ddviBoardNumber -ddvibn	1 .. 128 selects the input card	1
-ddviBoardChannelNumber -ddvibc	1, .2 selects the adapter on the input card	1
-ddviDirtyEdge -ddvide	0.0 .. 10.0 percentage of cut-off for overscan	3.0 sources of setting 1, 2 0.0 sources of setting 3, 4, 5
-ddviPlayMode	Live, Still select display mode	Live

Table 4-23

Options concerning Dual RGB Input Card

option	argument meaning	default
-drgbRed -drgbre	0.0 .. 1.0 determines the start value of red	0.5
-drgbGreen -drgbgr	0.0 .. 1.0 determines the start value of green	0.5
-drgbBlue -drgbbl	0.0 .. 1.0 determines the start value of blue	0.5
-drgbBrightness -drgbbr	0.0 .. 1.0 determine the start value of brightness	0.5
-drgbReduction -drgbrd	0 .. 15 determine the reduction rate	6
-drgbPreset -drgbpr	1 .. n Determine preset as line number in preset file	1
-drgbBoardNumber -drgbbn	1 .. 128 selects the input card	1
-drgbBoardChannelNumber -drgbbc	1, 2 selects the adapter on the input card	1
-drgbPlayMode -drpm	Live, Still select display mode	Live

Table 4-24

Options concerning config and preset files

option	argument meaning	default
-configFile -cf	<filename> specifies user configuration file	/etc/MMTconfig/xvideo.conf
-noConfigFile -ncf	user configuration file will not be read	
-presetFile -pf	<filename> specifies preset file for RGB and YPrPb input	/etc/MMTconfig/presets.prf
-factoryPresetFile -fpf	<filename> specifies factory preset file for RGB input, see Table 7-13 (read if no other preset file is specified).	/opt/MMT2686/etc/xvideo/presets.prs
-mpgPresetFile -mpgpf	<filename> specifies streaming video preset file	/etc/MMTconfig/mpgpresets.prs
-mpgBoardFile -mpgbf	<filename> specifies configuration file for STREAMING VIDEO CARDS.	/etc/MMTconfig/mpgboard.conf

Table 4-25

X.11 window geometry

The geometry variable of an X.11 window specifies its size and its placement on the screen. The geometry, specified with the geometry resource, has the form:

`<w>x<h>+<xoff>+<yoff>`

Here *w* and *h* give the width and height of the window, measured in pixels. The values *xoff* and *yoff* give the offset in pixels from the screen's left edge and top edge respectively. If the '+' preceding is replaced by '-', *xoff* and *yoff* give the offset of the screen's right edge or bottom edge. For example:

`300x400+200+100`

width: 300 pixel, height: 400 pixel

top left corner positioned at *x*=200, *y*=100

relative to the top left corner of the screen;

`300x400`

width: 300 pixel, height: 400 pixel

position not specified;

`300x400-200+100`

width: 300 pixel, height: 400 pixel

top right corner positioned at *x*=200, *y*=100

relative to the top right corner of the screen;

`300x400-200-100`

width: 300 pixel, height: 400 pixel

bottom right corner positioned at *x*=200, *y*=100

relative to the bottom right corner of the screen.

You can omit any of the elements in the geometry specification (e.g., the position in `-canvasGeom 300x400`). The window manager – a special client controlling the layout of the windows – will use default values for the missing elements.

Example for `-canvasDisplay`

The canvas and control panel can be displayed on different desktops. The control panel can be directed to any host computer with the option `-display`. In this case, the canvas panel can be directed to TRANSFORM A with the option `-canvasDisplay`.

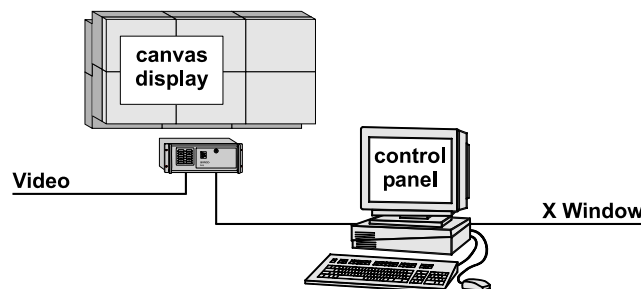


Figure 4-13
Redirected control panel

4.6.6 The resource files

You can adjust the behavior of an X client by providing options on the command line when you call it. These options specify the values of certain attributes of clients called resources. In addition, you can place specifications that establish defaults for resources in resource files.

The concept of resource files is complex and therefore only the basics necessary for fundamental understanding can be treated here.

Further documentation

A detailed and complete description can be found in:

- **X Window System User's Guide - Volume 3**

Valerie Quercia, Tim O'Reilly
O'Reilly & Associates, January 1993
ISBN: 1565920155

Syntax

The **resource** syntax knows **loose binding** and **tight binding**:

<code>name*variable:value</code>	loose binding
<code>name.variable:value</code>	tight binding

Table 4-26

The **loose binding**:

```
xvideo*title:my video
```

determines both the title of the **control panel** and the title of the **canvas panel**. Whereas the **tight binding**:

```
xvideo.ctrl.title:my xvideo control panel
xvideo.canv.title:my xvideo canvas panel
```

determines the titles of control and canvas panel separately.

-name option

The xforms toolkit option **-name** allows to control which resource is evaluated when starting xvideo. So, if two different **resources** for foo and for dummy are defined:

```
xvideo-foo.ctrl.title:foo control panel
xvideo-foo.canv.title:foo control panel

xvideo-dummy.ctrl.title: dummy control panel
xvideo-dummy.canv.title: dummy control panel
```

xvideo can be started two times with different settings:

```
eos:/root # xvideo -name xvideo-foo
eos:/root # xvideo -name xvideo-dummy
```

Classes

An important component of the resource concept are **classes**. The xvideo client belongs to the XVideo class. Indeed all mentioned resources belong to this class.

This way, it is possible to define settings, which effect all xvideo clients. E. g.,

```
XVideo*encoding:PAL
XVideo*recording:VHS
```

is evaluated by both clients xvideo-foo and xvideo-dummy concerning the example above.

Path of resource files

The resources are stored in **resource files**. These files must be located in certain directories and must be named correctly.

These paths and variables are evaluated in this sequence:

- /usr/lib/X11/app-defaults/XVideo
- \$XAPPRLESDIR/XVideo
- RESOURCE_MANAGER or if empty: ~/.Xdefaults
- \$XENVIRONMENT or if empty: ~/.Xdefaults-<hostname>
- options on the command line

Resources of the XVideo class concerning the control panel

option	argument meaning	default
ctrl.title	string see option -ctrlTitle above	xvideo control panel
ctrl.geometry	string see option -ctrlGeom above	+50+100
ctrl.visible	bool see option -ctrlVisible above	true
ctrl.iconic	bool see option -ctrlIconic above	false
followMouse	bool see option -followMouse above	true
activeGrabber	bool see option -activeGrabber above	true

Table 4-27

Resources of the XVideo class concerning the canvas panel

option	argument meaning	default
canvas.display	string see option -canvasDisplay above	\$DISPLAY
canvas.title	string see option -canvasTitle above	xvideo canvas panel
canvas.geometry	string see option -canvasGeom above	768x576+450+100
canvas.iconic	bool see option -canvasIconic above	false
canvas.maxSize	string allows to limit the maximum size of the canvas panel, 0x0 is unlimited	0x0
canvas.minSize	string allows to limit the min. size of the canvas panel, 0x0 is unlimited	0x0
canvas.ratioAspect	bool see option -ratioAspect above	true
canvas.AllowResize	bool see option -allowResize above	true
canvas.noBorder	bool see option -noBorder above	false
canvas.backGround	bool see option -canvasBackground above	blue

Table 4-28

Resources of the XVideo class concerning module video and module RGB

option	argument meaning	default
moduleVideo	geometry see option -moduleVideo above	
moduleGeometry	geometry see option -moduleGeometry above	

Table 4-29

Resources of the XVideo class concerning the Quad Analog Video Card

qav.recording	string see option -qavRecording above	VHS
qav.RefreshRate	int see option -qavRefreshRate above	1
qav.contrast	double see option -qavContrast above	0.5
qav.brightness	double see option -qavBrightness above	0.5
qav.saturation	double see option -qavSaturation above	0.5
qav.boardMenu	string Sets the names of the video card appearing in the video cards menu. 64 names, each 12 characters, separated by ' ' are allowed. First name matches first video card and so on.	QAVC 1 QAVC 2 QAVC 3 ...
qav.boardNumber	int see option -qavBoardNumber above	1
qav.boardChannelMenu1	string Sets the names of the adapters of the first video card appearing in the channel menu. 4 names, each 12 characters, separated by ' ' are allowed. First name matches first adapter and so on.	Channel 1 Channel 2 Channel 3 Channel 4
...		
qav.boardChannelMenu64	string Sets the names of the adapters of the 64 th video card appearing in the channel menu. 4 names, each 12 characters, separated by ' ' are allowed. First name matches first adapter and so on.	Channel 1 Channel 2 Channel 3 Channel 4
qav.boardChannelNumber	int see option -qavBoardChannelNumber above	1
qav.dirtyEdges	double see option -qavDirtyEdges above	3.0
qav.playMode	string see option -qavPlayMode above	Live

Table 4-30

Resources of the XVideo class concerning the Streaming Video Card

mpg.refreshRate	int	1	see option -mpgRefreshRate above
mpg.contrast	double	0.5	see option -mpgContrast above
mpg.brightness	double	0.5	see option -mpgBrightness above
mpg.saturation	double	0.5	see option -mpgSaturation above
mpg.boardMenu	string	SVC 1 SVC 2 SVC 3 ...	Sets the names of the video card appearing in the video cards menu. 64 names, each 12 characters, separated by ' ' are allowed. First name matches first video card and so on.
mpg.boardNumber	int	1	see option -mpgBoardNumber above
mpg.boardChannelMenu1	string	Channel 1 Channel 2 Channel 3 Channel 4	Sets the names of the video channels of the first video card appearing in the channel menu. 4 names, each 12 characters, separated by ' ' are allowed. First name matches first adapter and so on.
...			
mpg.boardChannelMenu64	string	Channel 1 Channel 2 Channel 3 Channel 4	Sets the names of the video channels of the 64 th video card appearing in the channel menu. 4 names, each 12 characters, separated by ' ' are allowed. First name matches first adapter and so on.
mpg.boardChannelNumber	int	1	see option -mpgBoardChannelNumber above
mpg.dirtyEdges	double	3.0	see option -mpgDirtyEdges above
mpg.playMode	string	Live	see option -mpgPlayMode above
mpg.preset	int	1	see option -mpgPreset above
mpg.presetName	string		see option -mpgPresetName above

Table 4-31

Resources of the XVideo class concerning the Quad SDI Video Card

qsdi.refreshRate	int	1	see option -qsdiRefreshRate above
qsdi.contrast	double	0.5	see option -qsdiContrast above
qsdi.brightness	double	0.5	see option -qsdiBrightness above
qsdi.saturation	double	0.5	see option -qsdiSaturation above
qsdi.boardMenu	string	QSDI 1 QSDI 2 QSDI 3 ...	Sets the names of the video card appearing in the video cards menu. 64 names, each 12 characters, separated by ' ' are allowed. First name matches first video card and so on.
qsdi.boardNumber	int	1	see option -qsdiBoardNumber above
qsdi.boardChannelMenu1	string	Channel 1 Channel 2 Channel 3 Channel 4	Sets the names of the adapters of the first video card appearing in the channel menu. 4 names, each 12 characters, separated by ' ' are allowed. First name matches first adapter and so on.
...			
qsdi.boardChannelMenu64	string	Channel 1 Channel 2 Channel 3 Channel 4	Sets the names of the adapters of the 64 th video card appearing in the channel menu. 4 names, each 12 characters, separated by ' ' are allowed. First name matches first adapter and so on.
qsdi.boardChannelNumber	int	1	see option -qsdiBoardChannelNumber above
qsdi.dirtyEdges	double	3.0	see option -qsdiDirtyEdges above
qsdi.playMode	string	Live	see option -qsdiPlayMode above

Table 4-32

Resources of the XVideo Class concerning the Dual DVI Input Card

option	argument meaning	default
ddvi.red	double see option -ddviRed above	0.5
ddvi.green	double see option -ddviGreen above	0.5
ddvi.blue	double see option -ddviBlue above	0.5
ddvi.inputSignal	int see option -ddviInputSignal above	3
ddvi.dirtyEdge	double see option -ddviDirtyEdge above	3.0 0.0
ddvi.downLoadEdid	string see option -ddviDownLoadEdid above	
ddvi.upLoadEdid	string see option -ddviUpLoadEdid above	
ddvi.reduction	int see option -ddviReduction above	128
ddvi.noiseReduction	int see option -ddviNoiseReduction above	0
ddvi.deinterlaceMode	int see option -ddviDeinterlaceMode above	5
ddvi.preset	int see option -ddviPreset above	1
ddvi.boardMenu	string Sets the names of the video card appearing in the video cards menu. 64 names, each 12 characters, separated by ' ' are allowed. First name matches first video card and so on.	DDVI 1 DDVI 2 DDVI 3 ...
ddvi.boardNumber	int see option -ddviBoardNumber above	1
ddvi.boardChannelMenu1	string Sets the names of the adapters of the first video card appearing in the channel menu. 2 names, each 12 characters, separated by ' ' are allowed. First name matches first adapter and so on.	Channel 1 Channel 2
...		
ddvi.boardChannelMenu128	string Sets the names of the adapters of the 64 th video card appearing in the channel menu. 2 names, each 12 characters, separated by ' ' are allowed. First name matches first adapter and so on.	Channel 1 Channel 2
ddvi.boardChannelNumber	int see option -ddviBoardChannelNumber above	1
ddvi.playMode	string see option -ddviPlayMode above	Live

Table 4-33

Resources of the XVideo Class concerning the Dual RGB Input Card

option	argument meaning	default
dr gb . red	double see option -dr gbRed above	0.5
dr gb . green	double see option -dr gbGreen above	0.5
dr gb . blue	double see option -dr gbBlue above	0.5
dr gb . brightness	double see option -dr gbBrightness above	0.5
dr gb . reduction	int see option -dr gbReduction above	6
dr gb . preset	int see option -dr gbPreset above	1
dr gb . boardMenu	string Sets the names of the video card appearing in the video cards menu. 128 names, each 12 characters, separated by ' ' are allowed. First name matches first video card and so on.	DRGB 1 DRGB 2 DRGB 3 ...
dr gb . boardNumber	int see option -dr gbBoardNumber above	1
dr gb . boardChannelMenu1	string Sets the names of the adapters of the first video card appearing in the channel menu. 2 names, each 12 characters, separated by ' ' are allowed. First name matches first adapter and so on.	Channel 1 Channel 2
...		
dr gb . boardChannelMenu128	string Sets the names of the adapters of the 128 th video card appearing in the channel menu. 2 names, each 12 characters, separated by ' ' are allowed. First name matches first adapter and so on.	Channel 1 Channel 2
dr gb . boardChannelNumber	int see option -dr gbBoardChannelNumber above	
dr gb . playMode	string see option -dr gbPlayMode above	Live

Table 4-34

Resources of the XVideo class concerning config and preset files

option	argument meaning	default
configFile	string see option -configFile above	/etc/MMTconfig/xvideo.conf
noConfigFile	see option -noConfigFile above	
presetFile	string see option -presetFile above	/etc/MMTconfig/presets.prf
factoryPresetFile	string see option -factoryPresetFile above	/opt/MMT2686/etc/xvideo/presets.prs
mpgPresetFile	string see option -mpgPresetFile above	/etc/MMTconfig/mpgpresets.prs
mpgBoardFile	string see option -mpgBoardFile above	/etc/MMTconfig/mpgboard.conf

Table 4-35

4.7 Remote-Control for OverView display walls

An OVERVIEW display wall can be controlled by TRANSFORM A. Commands can be sent to switch the lamps and analog video controllers on and off, or the status of the illumination units can be scanned.

The REMOTE-CONTROL can also be used for monitoring TRANSFORM A. Its operating status can be scanned and if necessary it can be halted or rebooted.

Alternatively the additional wall management software OSIRIS offers as well the functionality of a remote control, for the OSIRIS users manual see section [7.3 Order codes](#).

4.7.1 The Remote-Control daemon

The REMOTE-CONTROL is implemented in a client/server architecture. The REMOTE-CONTROL **daemon** is the central authority (server), that connects the REMOTE-CONTROL **clients** with the serial interface.

Four different REMOTE-CONTROL clients are available:

- **Monitor**
This service sets up a software based monitoring function. TRANSFORM A is rebooted automatically after absence of specific monitor telegrams.
- **Service**
This service includes the possibilities to halt or to restart the X server or to shut down or to reboot TRANSFORM A.
- **OverView**
The cubes of an OVERVIEW display wall (OVERVIEW-ML, OVERVIEW-MD, OVERVIEW-MP, ATLAS67C4-PSI) can be scanned and switched.
- **Switch**
The HERMES V2A, HERMES VXA, HERMES D2D and HERMES DXD can be scanned and switched. If available, the video controller can be operated.

Enabling/Disabling the daemon

The REMOTE-CONTROL daemon is by default disabled but can be enabled entering the following command in a shell:

```
chkconfig mmtrctrl on
```

After a reboot the daemon is started as written below.

To disable the daemon again use the command:

```
chkconfig mmtrctrl off
```

Starting the daemon

The REMOTE-CONTROL daemon is started automatically on system start with the script:

```
/sbin/init.d/rc2.d/S96rcrld
```

Following options are available:

Option	argument meaning	default
-a	auto configuration Deactivates auto configuration of the REMOTE-CONTROL chain, i. e. the automatic addressing of all connected devices having no address assigned.	active
-r	reconfiguration Deactivates automatic reconfiguration , i. e. the reconfiguration of the REMOTE-CONTROL chain on start up of the daemon.	active
-p	<port> Specifies the port of the daemon. (Default should not be changed!)	13579
-l	<msec> Specifies delay time in milliseconds for sending messages (OVERVIEW-ML)	200
-d	<msec> Specifies delay time in milliseconds for sending messages (OVERVIEW-MD, OVERVIEW-MP, ATLAS67C4-PSI, HERMES V2A, HERMES D2D, HERMES VXA, HERMES DXD)	20

Table 4-36

4.7.2 The Remote-Control clients (command line based)

In accordance with the offered services of the REMOTE-CONTROL daemon there are clients which use these services. Different clients can use the same service simultaneously.

rctrlmon

The monitor client `rctrlmon` monitors the connection between client (on host computer) and daemon (on TRANSFORM A). For this purpose, the client sends periodically keep-alive-telegrams for the daemon. The daemon boots TRANSFORM A after absence of the telegrams.

The `rctrlmon` client can be started as follows:

`rctrlmon [-<option>]`

Following options are available:

option	argument meaning	default
-h	<hostname> Specifies hostname or IP address, where the daemon is started.	local host
-p	<port> Specifies port of the <code>rcrld</code> daemon. (Default should not be changed!)	13579
-i	<KeepAliveIntervall> Specifies the period between two keep-alive-telegrams.	5 sec
-r	<KeepAliveRetries> Specifies the maximum number of missing telegrams, after which the daemon reboots TRANSFORM A.	10

Table 4-37

rctrlservice

The service client `rctrlservice` can be operated interactively or command-by-command.

The `rctrlservice` client can be started as follows:

`rctrlservice [-<option>]`

Following options are available:

option	argument meaning	default
-h	<hostname> Specifies hostname or IP address, where the daemon is started.	local host
-p	<port> Specifies port of the <code>rcrld</code> daemon. (Default should not be changed!)	13579
-e	<exec command> Specifies desired command.	

Table 4-38

The `rctrlservice` client accepts following commands:

command	meaning
restartxserv	Restarting X Server
stopxserv	Halting X Server
shutdownmmt	Rebooting TRANSFORM A
haltmmt	Halting TRANSFORM A
help	Returning a list and short descriptions of all available commands.
exit	Exits the client.

Table 4-39

If the client is operated interactively it prompts `rctrlservice>>`. The commands can be shortened by unambiguous short cuts.

rctrlleg

The OVERVIEW-ML client `rctrlleg` can be operated interactively or command-by-command.

The client `rctrlleg` can be started as follows:

`rctrlleg [-<option>]`

Following options are available:

option	argument meaning	default
-h	<hostname> Specifies hostname or IP address, where the daemon is started.	local host
-p	<port> Specifies port of the <code>rcrld</code> daemon. (Default should not be changed!)	13579
-e	<exec command> Specifies desired command.	

Table 4-40

The client accepts following commands:

command	meaning
bulb <number> all> <on off>	Switching off lamp
aux <number> all> <on off>	Switching to analog controller
info <number> all>	Scanning status of OVERVIEW cube
help	Returning a list and short descriptions of all available commands
exit	Exits the client.

Table 4-41

If the client is operated interactively it prompts `rctrlleg>>`. The commands can be shortened by unambiguous short cuts.

rctrldlp

The OVERVIEW-MD client `rctrldlp` can be operated interactively or command-by-command.

The client `rctrldlp` can be started as follows:

rctrldlp [-<option>]

Following options are available:

option	argument meaning	default
-h	<hostname> Specifies hostname or IP address, where the daemon is started.	local host
-p	<port> Specifies port of the <code>rctrld</code> daemon. (Default should not be changed!)	13579
-e	<exec command> Specifies desired command.	
-b	Switch off broadcast mode.	

Table 4-42

The client accepts following commands:

command	meaning
?	Returns a list and short descriptions of all available commands
help	Returns a list and short descriptions of all available commands
enable	Activate auto config mode
disable	Deactivate auto config mode
reconfig	Invoke reconfiguration
bulb <number all> ↳ <on off>	Switch lamp on/off
info <number all>	Scan status of OVERVIEW cube
restime	Reset operating hours to zero.
version	Get version number
exit	Exits the client.

Table 4-43

If the client is operated interactively it prompts `rctrldlp>>`. The commands can be shortened by unambiguous short cuts.

rctrlpsi

The OVERVIEW-MP or ATLAS67C4-PSI client `rctrlpsi` can be operated interactively or command-by-command.

The client `rctrlpsi` can be started as follows:

rctrlpsi [-<option>]

Following options are available:

option	argument meaning	default
-h	<hostname> Specifies hostname or IP address, where the daemon is started.	local host
-p	<port> Specifies port of the <code>rcrld</code> daemon. (Default should not be changed!)	13579
-e	<exec command> Specifies desired command.	
-s	Starting client in special mode for (re-)setting operation hours.	

Table 4-44

The client accepts following commands:

command	meaning
?	Returns a list and short descriptions of all available commands
help	Returns a list and short descriptions of all available commands
enable	Activate auto config mode
disable	Deactivate auto config mode
reconfig	Invoke reconfiguration
bulb <number all> ↳ <on off>	Switch lamp on/off
info <number all>	Scan status of OVERVIEW cube
restime	Reset operating hours to zero.
version	Get version number
exit	Exits the client.

Table 4-45

If the client is operated interactively it prompts `rctrlldlp>>`. The commands can be shortened by unambiguous short cuts.

rctrlswitch

The client `rctrlswitch` can be operated interactively or command-by-command.

The client `rctrlswitch` can be started as follows:

rctrlswitch [-<option>]

Following options are available:

option	argument meaning	default
-h	<hostname> Specifies hostname or IP address, where the daemon is started.	local host
-p	<port> Specifies port of the <code>rcrld</code> daemon. (Default should not be changed!)	13579
-e	<exec command> Specifies desired command.	

Table 4-46

The `rctrlswitch` client accepts following commands:

command	meaning
enable	activating auto config mode
disable	deactivating auto config mode
reconfig	invoking reconfiguration
aux <ctrl number all> <on off>	switching between different inputs
switch <ctrl number all> ↘ <input,output>	assigning input to output channels (HERMES DXD and HERMES VXA only) input and output can either be indicated in the form e.g. 1, 2 or 2, 2 or a shortcut can be used: thru or = In1 to Out 1, In2 to Out 2 cross or x In1 to Out 2, In2 to Out 1 1, both or 1, b In1 to Out 1 and Out2 2, both or 2, b In2 to Out 1 and Out2
version <ctrl number all>	returning the version of the device
help	returning a list and short descriptions of all available commands
exit	Exits the client.

Table 4-47

Additionally, for a HERMES V2A or a HERMES VXA, which is equipped with an analog controller for RGB or video signals following commands are available:

command	Meaning
left <ctrl number>	sending left command to analog controller
right <ctrl number>	sending right command to analog controller
up <ctrl number>	sending up command to analog controller
down <ctrl number>	sending down command to analog controller
menu <ctrl number>	sending menu command to analog controller
enter <ctrl number>	sending enter command to analog controller
+ <ctrl number>	sending plus command to analog controller
- <ctrl number>	sending minus command to analog controller

Table 4-48

If the client is operated interactively it prompts `rctrlswitch>>`. The commands can be abbreviated by unambiguous short cuts.

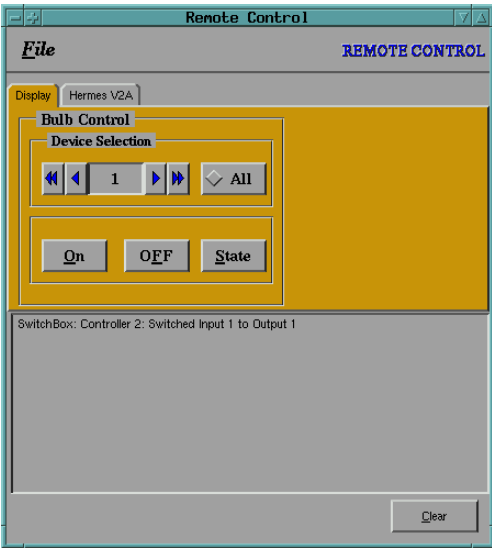
4.7.3 The GUI Remote-Control client

An OVERVIEW-ML or OVERVIEW-MP display wall, HERMES V2A, HERMES D2D, HERMES VXA and HERMES VXD can be controlled with the GUI REMOTE-CONTROL client. The GUI REMOTE-CONTROL client `rctrl` can be started as follows:

```
# rctrl [-<option>]
```

After `rctrl` is started (e. g. choose from menu following left click on root window) a **control panel** shows up offering a graphical user interface for controlling the OVERVIEW cubes and the various HERMES-boxes.

Display



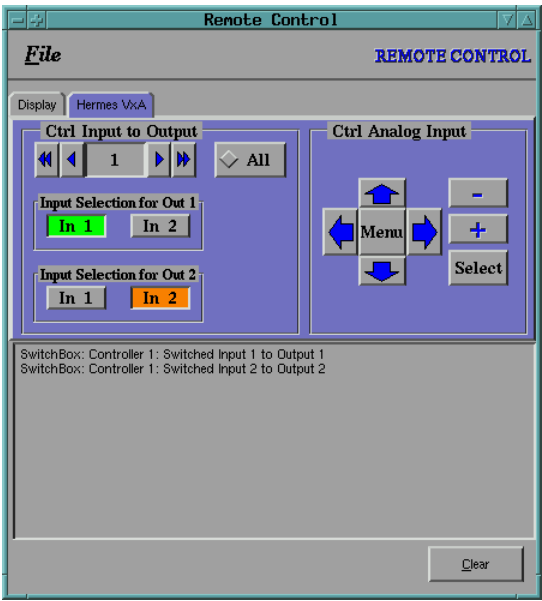
1	Single cubes can be specified by scrolling with the arrow buttons
All	Send respective command to all connected cubes
On	Switch on specified cube
Off	Switch off specified cube
State	Send a request to the specified cube. The reply is displayed in the status display below.
Clear	Clear the status display above
File: Exit	Exit the <code>rctrl</code> client

Figure 4-14

The REMOTE-CONTROL daemon detects automatically which type of OVERVIEW display wall is connected to TRANSFORM A. Initially the statuses of the connected cubes are displayed also automatically in the status display.

Be careful not to switch off the cube, that currently displays the control panel, because it would be difficult to switch it on again by REMOTE-CONTROL!

Switch



1	A single unit can be specified by scrolling with the arrow buttons
All	Send respective command to all connected unit
In 1 for Out 1	Switch first output to first input
In 2 for Out 1	Switch first output to second input
Only applicable for HERMES DXD and HERMES VXA:	
In 1 for Out 2	Switch second output to first input (color code according to LEDs)
In 2 for Out 2	Switch second output to second input (color code according to LEDs)
HERMES V2A and HERMES VXA only:	
Left	Send left command to analog controller
Right	Send right command to analog controller
Up	Send up command to analog controller
Down	Send down command to analog controller
Menu	Send menu command to analog controller
Select	Send enter command to analog controller
+	Send plus command to analog controller
-	Send minus command to analog controller

Figure 4-15

Options

The `rctrl` client accepts the following options on the command line. The **options** are listed together with their respective **arguments** and **default** values and a short description of their **meaning**.

option	argument meaning	default
-name	string Changes application name and allows to specify a certain resource file.	none
-display	string Specifies remote host.	\$DISPLAY
-geometry	geometry Specifies position and size of the <code>rctrl</code> control panel.	+200+100
-h	<hostname> Specifies hostname or IP address, where the <code>rctrl</code> daemon is started.	Local host
-po -port	<port> Specifies port of the <code>rcrld</code> daemon. (Default should not be changed!)	13579
-e	0 1 Activates or deactivates automatic reconfiguration .	0
-r	Invokes reconfiguration .	

Table 4-49

Refer to section [4.6.5 The options](#) for a description of the `geometry` type in X.11, please.

Resources of the rctrl class

Refer to section 4.6.6 The resource files, please, for a description of the resources concept of X.11 including the respective path names. The name of the resource file itself must be RCtrl instead. A template for such a resource file is:

```
/opt/MMT2686/bin/linux/RCtrl
```

The following table lists all resources of the rctrl class:

option	argument meaning	default
title	string Determines the window title of the rctrl control panel.	REMOTE-CONTROL
geometry	string see option -geometry above	+200+100
host	<hostname> Specifies hostname or IP address, where the daemon is started.	Local host
port	<port> Specifies port of the rcrld daemon. (Default should not be changed!)	13579
iconic	0, 1 Iconifies (value=1) or resizes (value=0) the rctrl control panel.	0
avcEnableConfig	0 1 see option -e above	0
avcReconfig	0 1 see option -r above	0

Table 4-50

4.7.4 Hot-keys

The commands for controlling the illumination units of an OVERVIEW display wall can be entered directly with hot-keys on the TRANSFORM A keyboard.

hot-keys				meaning
CTRL-LEFT	SHIFT-LEFT	<number of module>	o	Switching on lamp
CTRL-LEFT	SHIFT-LEFT	<number of module>	f	Switching off lamp
CTRL-LEFT	SHIFT-LEFT	<number of unit>	a	Switching to analog input/In 1
CTRL-LEFT	SHIFT-LEFT	<number of unit>	d	Switching to digital input/In 2

Table 4-51

The keys **Ctrl-left** (left Control key) and **Shift-left** (left Shift key) must be pressed until the hot-key sequence is finished by entering the number of the respective projection module and the desired command.



In the configuration file of TransForm A the hot-keys can be re-configured. See section 6.1.6
[Advanced configuration of TransForm A.](#)

4.8 Utilities

4.8.1 Show wallinfo utility

The X Server provides information about the hardware of the display wall and its setup. This information can be requested as follows:

showwallinfo [-<option>]

The following options are available:

option	argument meaning	value
-d	<display> <display> must be specified in two parts: hostname:displaynumber . For the hostname the name of the TRANSFORM A or its IP must be specified. With the displaynumber the X Server is specified. 0 must be indicated for the display of TRANSFORM A. 1 must be indicated for OSIRIS.	0, 1
-v	<verbose> The level of information can be selected. 1 is basic information, 2 is full information. Selecting 0 or omitting verbose provides just a very short description.	0, 1, 2

Table 4-52

4.8.2 DDC utility

The UGX GRAPHIC CARD and the AGX GRAPHIC CARD supports each the DDC standard. DDC stands for Display Data Channel. As a standard communication channel between a computer display and a host system it allows to automatically detect the best setting for a DDC capable display by obtaining these parameters from the display itself.

If the connected display devices support the DDC standard, information of this graphic device can be requested as follows:

ddcinfo

No further options are required.

ddcinfo can only be requested as long as the X server is not running.

4.8.3 Boot loader utility

When booting a TRANSFORM A in eXtended safety mode a graphical menu appears to select the boot partition. Please refer also to section [3.3.2 Switching on](#). The boot loader utility helps to change this if wanted. Therefore change by using cd to the directory:

```
cd /opt/MMT2686/config/
```

To switch on the graphical boot selection use:

```
/opt/MMT2686/config/bootgraph on
```

To switch it off use:

```
/opt/MMT2686/config/bootgraph off
```

4.8.4 Restart X server utility (service mmtserv)

The **service mmtserv** utility can be used to restart the X server. By means of the options the color mode can be determined. If the utility is called without option, the X server settings that were assigned in the X.11 configuration are applied. Thus the utility enables to change the color mode without the necessity to run through the X.11 configuration. The following options are available:

option	meaning
pseudo	Restart X server in PseudoColor mode, 8 bpp
true	Restart X server in TrueColor mode, 16 bpp
direct	Restart X server in DirectColor mode, 16 bpp
true32	Restart X server in TrueColor mode, 32 bpp
direct32	Restart X server in DirectColor mode, 32 bpp

Table 4-53
options of service mmtserv

To restart the X server in TrueColor mode, with 32 bpp color depth the following input would be necessary:

service mmtserv true32

Alternatively the X server can be restarted by means of the entries in the work menu of the window manager, please refer to section [4.5 Window manager](#).



Please keep in mind that a higher color depth requires also a higher bandwidth for graphic data.

In addition, changing the color mode of the X server may change the color mode of video or RGB and lead therefore also to an increase in required bandwidth for video, please refer to section [4.2.2 Color capabilities](#) to see which video color mode applies for which X server color mode and to section [4.6.1 The input cards](#) to see the required bandwidth for video and RGB.

Both effects may lead to a loss of performance!



It is not possible to restart the X server in multi-color-depth, if an other color mode has been configured in the X.11 configuration.

But if the X server has been configured in multi-color-depth it can be restarted with the other color depths mentioned above. To revert to multi-color-depth the X server must be restarted without option in the default setting.

4.8.5 Backup and restore procedures (eosxs Utility)

If TRANSFORM A is operated in eXtended safety boot mode, see section [6.1.1 Boot modes](#) a backup of the complete working partition, including the TRANSFORM A system installation, the X.11 configuration and any additional configuration can be made. Besides the main intention of eliminating the risk of a corrupted file system, new configurations can first be checked and undone if derived.

Check backup procedure

To check if a fully functional system backup is stored on the backup partition enter **service eosxs** with the option **check** into the command line:

```
service eosxs check
```

With an operable backup the system will respond:

```
eosxs check: OK check passed
```

Backup information

Date and time when the backup was made, gets returned by means of the **info** option. Therefore enter the following expression into the command line.

```
service eosxs info
```

Thereupon date and time of the backup is displayed.

Backup procedure

The following steps must be performed to get a backup of the current state of an TRANSFORM A configuration:

- After finishing the configuration, reboot TRANSFORM A to make sure, that the configuration is really functional!
- If the TRANSFORM A rebooted properly and the system works the way it was intended, then locally log in on TRANSFORM A as root. Take care, that the X server does not run and enter to the command line **service eosxs** with the option **backup**:

```
service eosxs backup
```
- Date and time of the last backup is displayed and you will be prompted to confirm the backup procedure by typing **y**.
- Now the system changes into a lower operating level and copies the working partition onto the backup partition. When copying is finished the system reboots from the working partition and can be used as before, but with the security of having an actual system backup for the unlikely but not impossible case of a corrupted file system on the working partition.

Restore procedure

Whenever it is necessary to go back to a saved configuration or to restore the working partition, one out of two possible procedures can be performed.

Either:

- When booting TRANSFORM A the option **backup** can be selected. It either must be selected from the graphical menu when the system comes up, please refer to section 3.3.2 [Switching on](#) or the option must be typed as soon as the `LiLo` prompt appears. This is dependent on the settings chosen by means of the boot loader utility, please refer to section 4.8.3 [Boot loader utility](#).

Or:

- When TRANSFORM A is running, enter into the command line **service eosxs** with the option **restore** to boot from the backup partition:

service eosxs restore

In both cases you have to be logged in locally on the TRANSFORM A and the X server must not be started.

Before the restore procedure actually starts, date and time of the backup is displayed and you will be prompted to confirm the restore procedure by typing **y**.

Following that, the TRANSFORM A boots from the backup partition. After booting it copies back the version of the working partition that is stored on the backup partition to the working partition. This means that the currently used working partition becomes overwritten. When copying is finished, TRANSFORM A reboots automatically, this time it boots from the working partition and is therewith operable again, based on the state of system and configuration from the time of the backup.



Whenever booting from the backup partition the content of the working partition becomes overwritten with the backup. This means the current content of the working partition gets lost!

4.8.6 Release integrity utility (eosinfo)

The integrity of the current installation can easily be checked by means of the eosinfo utility. If eosinfo is entered into the command line, all RPM packages that are installed will be returned. This may look like the following list:

This are the Factory shipped RPM Packages (Rel 4.2.0):

```
-----
eosbigcursor-2.4.0-1
eoscfg-2.5.0-1
eoscompatfonts-1.0.1-1
eosconfig-4.2.0-1
eosdiskless-4.2.0-1
eosians-3.4.8-1
eosipc-4.2.0-1
eosmisc-4.2.0-1
eosrctrl-4.1.0-1
eosuser-2.4.0-1
eosutil-4.1.0-1
eosvwm2cfg-4.2.0-1
eosxblink-2.4.0-1
eosxgenlock-4.2.0-1
eosxmc-4.1.0-1
eosxserver-dis-4.2.0-1
eosxserver-mon-4.2.0-1
eosxtest-2.4.0-1
eosxtrap-2.4.0-1
eosxvideo-4.2.0-1
-----
```

The EOS System is in a save state

If there are RPM packages installed on the hard disk that do not belong to the current release or if there are appendant RPM packages missing, this is specially marked in the list and may look like the following:

This are the Factory shipped RPM Packages (Rel 4.2.0):

```
-----
eosbigcursor-2.4.0-1
eoscfg-2.5.0-1
eoscompatfonts-1.0.1-1
eosconfig-4.2.0-1
eosdiskless-4.2.0-1
eosians-3.4.8-1
eosipc-4.2.0-1
eosmisc-4.2.0-1
eosrctrl-4.1.0-1
eosuser-2.4.0-1
eosutil-4.1.0-1
eosvwm2cfg-4.2.0-1
eosxblink-2.4.0-1
eosxgenlock-4.2.0-1
eosxmc-4.1.0-1
eosxserver-dis-4.2.0-1
eosxserver-mon-4.2.0-1
eosxtest-2.4.0-1
eosxtrap-2.4.0-1
eosxvideo-4.2.0-1
-----
```

WARNING!!

The following EOS RPM Package(s) have been altered:

```
-----
eosxserver-mon-4.2.0-1
eosxvideo-4.2.0-1
-----
```

4.8.7 Network reporting utility (procfg)

The **procfg** utility serves to gain information about the configuration and state of the network cards. It can be used for network cards that use the driver **e100** or **e1000**, please refer to section [3.4.1 System configuration](#). The information can be requested as follows:

procfg [-<option>]

The following command line options are the most useful:

option	argument meaning	value
blink eth<nr>	-t <seconds> The LED on the Ethernet card with the specified number <nr> starts fast blinking for 10 seconds. If -t is indicated the LED blinks during the specified time interval.	
tree	Displays an overview about the inserted network cards including an AFT team.	
teams	lists name and mode of the team and information about its primary adapter, please refer also to section 6.1.7 Redundant network adapter . -m lists all members of the team and their current properties. -i lists interface name, IP address, netmask, broadcast and state of the team members. -p lists the load time parameters and values of the team members.	
adapters	-a Information about the link state, speed and duplex of the network cards and AFT teams is displayed.	

Table 4-54
Options of the procfg utility

More information about **procfg** can be found in the manual pages. The manual pages can be read by entering **man procfg** into the command line.

4.8.8 Genlock utility

The genlock utility enables alternatively to the window manager access to the genlock functionality, please refer also to section [4.5 Window manager](#). But it offers also access to advanced functionality that is not operable by means of the window manager.

In interactive mode entering **xgenlock** in the command line starts the utility:

```
xgenlock
xgenlock>>
```

In the following the options can be entered, e.g. **on** to switch on genlock:

```
xgenlock>>on
```

The following table lists the options of **xgenlock**:

option	value / meaning
help ?	lists all options of xgenlock
quit	quits the utility
off	switches genlock off
on	switches genlock on
external	selects an external source as genlock signal
internal	selects the first UGX or AGX GRAPHIC CARD as genlock signal
qvsync <n><m>	n=1, 2, 3, ... ; m=1, 2, 3, 4 selects the QUAD ANALOG VIDEO CARD with the number <n> and channel <m> as genlock signal
ddvisync <n><m>	n=1, 2, 3, ... ; m=1, 2 selects the DUAL DVI INPUT CARD with the number <n> and channel <m> as genlock signal
svcsync <n><m>	n=1, 2, 3, ... ; m=1, 2, 3, 4 selects the STREAMING VIDEO CARD with the number <n> and channel <m> as genlock signal
sdisync <n>	n=1, 2, 3, ... Selects the QUAD SDI VIDEO CARD with the number <n>; the first channel of the card is used as genlock signal.
firstsync	selects the first video input card as genlock signal
info	returns a list with information, if genlock is activated and which card is used for the genlock signal
state	returns a list with the state of the UGX or AGX GRAPHIC CARDS (refresh rate, ..)
monitoring <l>	l=1, 2, 3, ... repeats the option state <l> times
version	shows the version of the boot loader (genlock can be used from boot loader version 204 on)
rdef	reads and applies the default configuration file
wdef	Writes the current genlock settings into the default configuration file; these settings are applied automatically after each restart.
ras <file>	reads and applies the configuration file, that is specified with <file>
was <file>	writes the current genlock settings into a configurations file with the name <file>

Table 4-55
options of the xgenlock utility



When using genlock make sure, that the cabling for genlock has been established as explained in section [3.2.15 CPU board](#).

If an external signal is connected only external may be selected. If selecting internal or a video signal it will be disturbed by the external signal. Therefore the external signal should be unplugged before switching to an other type of genlock!

Genlock is available in an OmniBus configuration only!

The numbering of the cards does not consider special numbering as applied when using rendering engines or logical video channels. All cards of one type are always simply counted one after the other.

If not using **xgenlock** in interactive mode the option `-e` must be used to commit commands, e.g.:

xgenlock -e "on"

5 Maintenance

The devices of TRANSFORM A require very little maintenance. Some maintenance operations are nevertheless necessary to maintain distortion free operation of TRANSFORM A and can be done by means of the following descriptions.

**WARNING**

Maintenance operations not explained in this section bear the risk of electric shock and of injury from hazardous moving parts!



If a maintenance operation is needed that is not mentioned in this chapter, instruct authorized personnel with it!

5.1 Exchange of consumables

5.1.1 Replacing the filter pad of Processor

The filter pads of the PROCESSOR has to be changed in intervals, depending on the grade of pollution of the air. The air filter is located behind the ventilation slits [1] on the front of the PROCESSOR; please refer to [Figure 3-1 front view of the Processor](#).

- Unlock the front cover of the PROCESSOR with the key!
- Pull the handle of the filter mounting [2] into your direction!
- Pull out the filter mounting to the right!
- Remove the old filter pad!
- Insert a new filter pad!
- Insert the mounting into the PROCESSOR until the handle engages!
- Lock the front cover!



As long as the filter pad is not irreversibly blocked, cleaning it with a vacuum cleaner is also an acceptable method to maintain good air ventilation within the system!

5.1.2 Replacing the filter pad of OmniBus A12 and Extender

The filter pads of OMNIBUS A12 and EXTENDER devices have to be changed in intervals, depending on the grade of pollution of the air. The air filter is located behind the *ventilation slits* [1] on the front of the device; please refer to [Figure 3-7 Front view of OmniBus A12](#) and [Figure 3-13 Front view of the Extender](#) respectively.

- Unlock the ventilation flap by turning its *lock* [2] with the key and open it!
- Remove the old filter pad!
- Insert a new filter pad!
- Turn the ventilation flap upwardly and close it by turning the *lock* [2]!



As long as the filter pad is not irreversibly blocked, cleaning it with a vacuum cleaner is also an acceptable method to maintain good air ventilation within the system!

5.1.3 Replacing a power module of OmniBus A12

The OMNIBUS A12 with redundant, hot-plug power modules can be connected to three independent power nets. If one of the three power modules or a power net is failing, you can hear a buzzer alarm that can be reset by pushing the red *buzzer reset* button [5] at the front of the OMNIBUS A12, please refer to [Figure 3-7 Front view of OmniBus A12](#). Also the LED *standby / component failed* [6] at the front starts blinking. This LED remains blinking as long as the failure persists even if the *buzzer reset* button has been pressed.

23	air supply
24	mains connection
25	LED: power status
27	unlock-handle-bar
28	handle

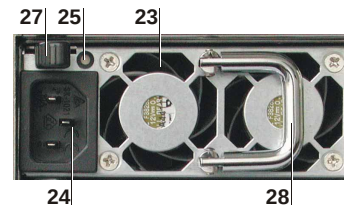


Figure 5-1
Power module on the rear of OMNIBUS A 12

The defective power module or the failing power net can be located by examining the individual LEDs *power status* [25] on the back of the device, see above. If the LED of one power module is off or lightens red while the LEDs of the other two power modules lightens green, then the power module with the non-green LED is either defective and must be re-placed or the power net connected to it has failed.

Exchange of a redundant power module



Take care NOT to remove a power module from the device unless you unplugged its power cord.

Never touch the contacts on the backside of a power module. There is the danger of being harmed by residual voltage! Furthermore the operation of the power module might be impacted by impurities!



Use gloves to remove the power module. The cover of the power module is been used as heat sink for cooling, usually the temperature is around 50 – 60° Celsius under full condition!



When exchanging a power module during operation of the OMNIBUS A12, the two other power modules have to be in operation.

- Locate the defective power module by examining the *LEDs* [25] on the individual power modules, please see above.
- Unplug the power cord from the *mains connection* [24] of the concerned power module!
- Push the *unlock-handle-bar* [27] to the right unless the power module is released, keep it at the right and remove the defective power module by pulling at the *handle* [28]!
- Take a new power module and insert it into the system. Take care to insert it in the same orientation like the other modules with the *mains connection* [24] on the left side!
- Make sure that the *unlock-handle-bar* [27] engages!
- Re-plug the power cord into the *mains connection* [24]!
- Check that the *LED* [25] lightens up green!
- Check that the red LED *standby / component failed* [6] at the front of the OMNIBUS A12 stops to shine!
Please note: As soon as the defective power module is removed and the remaining two power modules are working well, this LED will also stop to shine. It only indicates if a defective component is in the device.

5.2 Cleaning

Use a soft cloth to periodically clean the cabinet. Stubborn stains may be removed with a cloth lightly dampened with mild detergent solution. Never use strong solvents, such as thinner or benzine, or abrasive cleaners, since these will damage the cabinet.

Unplug the device from the wall outlet before cleaning.



Never clean the case of an TransForm A device without first disconnecting all power supply cords!



Do not use liquid cleaners or aerosol cleaners!

6 Advanced configuration

This chapter provides help for reconfiguring the software of your TRANSFORM A.

6.1 Software installation and configuration

6.1.1 Boot modes

TRANSFORM A can be installed to be operated in normal boot mode or in eXtended safety boot mode. eXtended safety boot mode is the recommended boot mode for TRANSFORM A.

Normal boot mode

With normal boot mode the hard disk of the TRANSFORM A system is configured to have one partition, this is the working partition. Underlying is the ext3 file system that offers widely immunity to file corruption in case of power failure or when switching of the system without having performed a system shutdown before.

A TRANSFORM A with normal boot mode offers full write access to the system partition. To configure TRANSFORM A just insert the configuration disk into the DVD-ROM drive or call the corresponding configuration script from the hard disk and perform the configuration as explained in the corresponding sections.

Although the ext3 file system offers good protection against file system inconsistencies, for safely switching off, the system has to be shut down first (see section [3.3.3 Switching off](#)).

eXtended safety boot mode

With eXtended safety boot mode the hard disk of the TRANSFORM A system contains two partitions, the working partition and the backup partition. eXtended safety boot mode is like normal boot mode also based on the ext3 file system. But in addition it offers the possibility to store on the backup partition a backup of the whole system including its configuration. A backup with the current state of the working partition can be made at any time and the working partition can easily be restored in case of a miss-configuration or failure in operability. Please see section [4.8.5 Backup and restore procedures \(eosxs Utility\)](#) for details.

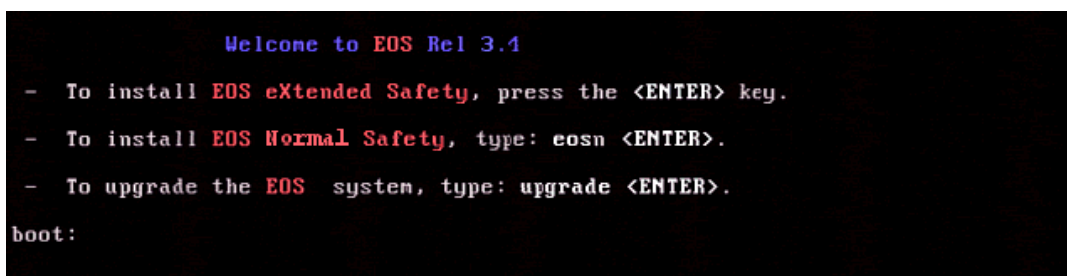
6.1.2 Installing system software on the hard drive

Usually TRANSFORM A comes with preinstalled system software. In case you want to reinstall the system software or install a new hard disk, please follow the instructions in this section.

Installation

Switch on TRANSFORM A and insert the system CD. TRANSFORM A will boot from CD. The Welcome Screen displays a selection of installation options. Select the type for your installation and enter the required keyword.

- TRANSFORM A in eXtended safety boot mode:
press the **<Enter>** key
- TRANSFORM A in normal boot mode:
type **eosn** and press the **<Enter>** key
- Upgrade TRANSFORM A:
please see section [6.1.3 Upgrading system software!](#)



```

Welcome to EOS Rel 3.1

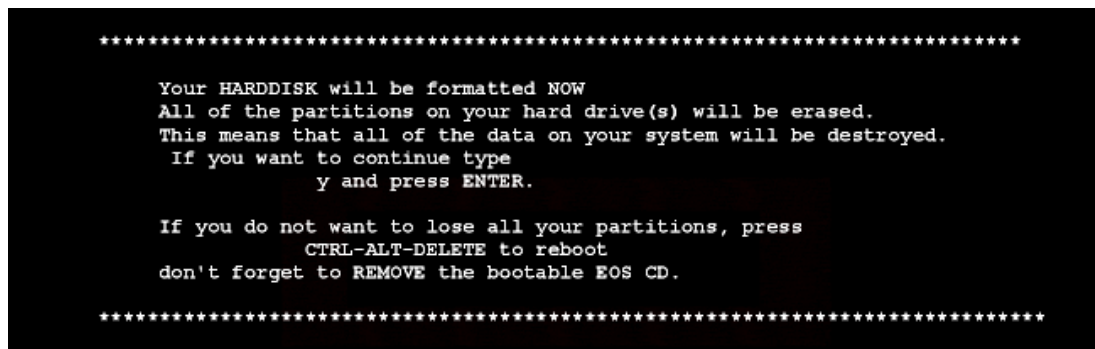
- To install EOS eXtended Safety, press the <ENTER> key.
- To install EOS Normal Safety, type: eosn <ENTER>.
- To upgrade the EOS system, type: upgrade <ENTER>.

boot:

```

Figure 6-1

After selecting the type of your installation, you are asked if you really want to delete the partitions and install the system software. If you want to skip the installation you can press **<alt><ctrl><delete>** simultaneously. If you want to install you must confirm with **y <cr>** and the TRANSFORM A operating system is getting installed.



```

*****
Your HARDDISK will be formatted NOW
All of the partitions on your hard drive(s) will be erased.
This means that all of the data on your system will be destroyed.
If you want to continue type
    y and press ENTER.

If you do not want to lose all your partitions, press
    CTRL-ALT-DELETE to reboot
don't forget to REMOVE the bootable EOS CD.

*****

```

Figure 6-2

When the system software is installed just the keyboard and the IP address of the primary network card must be specified. Select the type of the used keyboard with the **arrow** keys and confirm **OK**. If you press **Cancel** a keyboard of **us** type becomes installed by default.

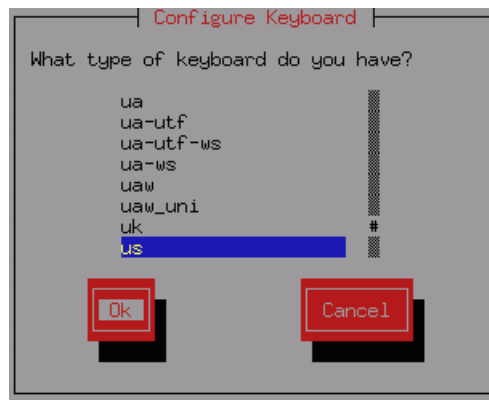


Figure 6-3

The configuration of the keyboard is reported:

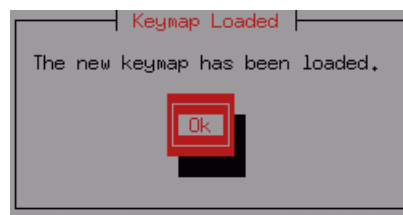


Figure 6-4

The second configuration item is the network configuration. Pressing the **Yes** button enables to insert an individual IP address and netmask. Pressing the **No** button configures the default IP address 192.168.0.1.

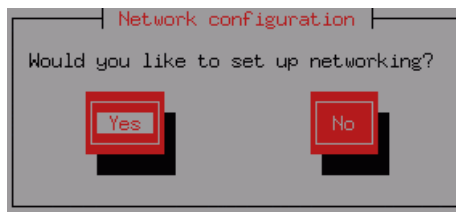


Figure 6-5

To set up networking, enter the IP address and netmask and if needed a default gateway and the primary name-server and confirm with **OK**. If in doubt about the network settings ask your network administrator for the values. When navigating through the dialog and leaving empty the fields for the default gateway or primary name server, there will be default values entered automatically into the empty fields. To overcome this the **F12** key can be pressed instead of the **OK** button.



Figure 6-6

When the installation is finished you are prompted to press the **<Enter>** key to reboot TRANSForm A.

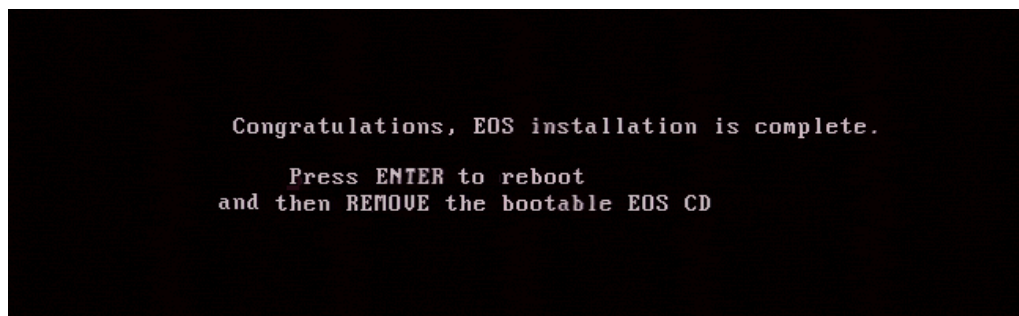


Figure 6-7

The system will reboot now. Remove the CD from the drive as soon as the drawer ejects it. After this system installation you have also to run through [3.4.1 System configuration](#) and [3.4.2 X.11 configuration](#) and if you have a distributed system through [3.4.3 Configuring a distributed system](#) or [3.4.4 Configuring a distributed system with multiple logical screens](#).

6.1.3 Upgrading system software

OmniBus configuration

All former system software on a TRANSFORM A in OmniBus configuration can be upgraded to the current version. No special considerations are required.

Processor configuration

Upgrading the system software to the current release is only possible if already release 2.4 or higher is installed on the Processor configuration.



Release 2.3 and earlier can not be upgraded to release 2.4 and higher. Instead a complete system installation is necessary. Please note that this will delete any data from the harddisk and that also complete configuration is necessary after the installation! Information about system installation you find in section [6.1.2 Installing system software on the hard drive](#).

Upgrade

To upgrade the system software, switch on TRANSFORM A and insert the installation CD **TRANSFORM A - system disc OVT-2686-1**. TRANSFORM A will boot from CD. The Welcome Screen displays a selection of installation and upgrade options. To upgrade TRANSFORM A type upgrade and press the **<Enter>** key.

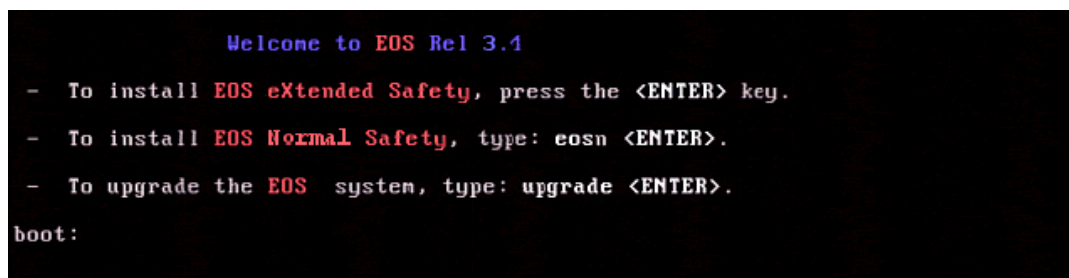


Figure 6-8

Before the upgrade starts just the keyboard must be specified. Select the type of the used keyboard with the **arrow** keys and confirm **OK**. If you press **Cancel** a keyboard of **us** type becomes installed by default.

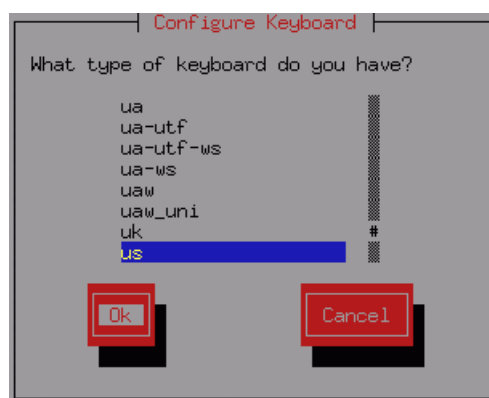


Figure 6-9

When the upgrade is finished you are prompted to press the **<Enter>** key to reboot TRANSFORM A.

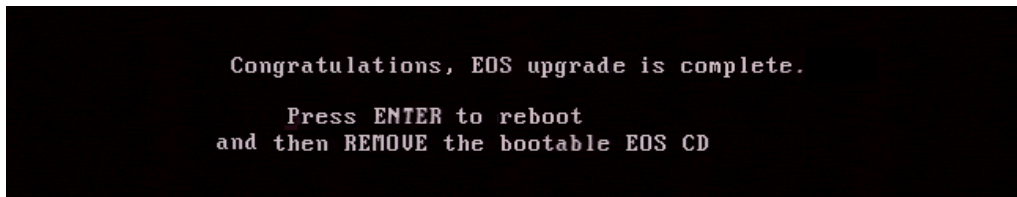


Figure 6-10

The system will reboot now. Remove the CD from the drive as soon as the drawer ejects it. After this system upgrade you have also to run through [3.4.2 X.11 configuration](#) and if you have a distributed system through [3.4.3 Configuring a distributed system](#) or [3.4.4 Configuring a distributed system with multiple logical screens](#).



If you operate TransForm A in eXtended safety boot mode, after the upgrade the backup partition still contains the backup of the working partition containing the state from before the upgrade. If you are sure that you want to keep the new release it is recommended to make a new backup of the system, please refer to section [4.8.5 Backup and restore procedures \(eosxs Utility\)](#).



From release 3.4 on the default assignment of video channels in a distributed system has changed. To maintain the former video assignment the option `-new_video_layout` must be removed from the X server parameters file `MMTServerConfig` each time after the X.11 configuration before restarting the X server; please see section [6.1.5 X server parameters](#).

6.1.4 Custom configuration

If you select **Custom Configuration** when starting the system configuration script, you run through an abbreviated configuration. The extent of the configuration can be customized, i. e. you can decide for each parameter whether it is called up by the configuration script or not.

Configuration

The default configuration for custom configuration is stored in a text file:

```
/etc/MMTconfig/MMTProfile
```

Each line contains a single keyword and its status, e. g.:

```
ASK_PRIMARY_HOSTNAME 1
```

Status **1** stands for **yes, the item is called up** during custom configuration, and status **0** stands for **no, item is not called up**. Blank lines as well as unknown keywords are ignored.

Following table shows the standard configuration for custom configuration, as stored in MMTProfile:

ASK_PRIMARY_NIC_TYPE	0	Type of interface (100 Mbps, BNC, ...)
ASK_X11_CURSOR	0	Size of X.11 cursor
ASK_X11_MOUSE	0	Type of X.11 mouse
ASK_X11_FONTSERVER	0	IP address and port number of font server
ASK_X11_BITPERPIXEL	0	Color depth (bit per pixel)
ASK_X11_VISUALCLASS	0	Visual class
ASK_X11_XDM	0	IP address of XDM and type of query
ASK_X11_MONITOR_TYPE	0	Type of monitor (analog/digital)
ASK_MONOLIT_SCREEN_MODE	0	Multi-head/multi-screen
ASK_MONOLIT_SCREEN_ARRANGEMENT	1	Layout of multi-screen mode
ASK_MONOLIT_MON_RESOLUTION	0	Resolution of monitor
ASK_ENGINE_NETWORK	0	IP address, net-mask, broadcast address for rendering machine
ASK_ENGINE_ETHERADDR	1	Ethernet address for rendering machine
ASK_ENGINE_SCREEN_ARRANGEMENT	0	Multi-screen layout for rendering machine
ASK_ENGINE_NIC_TYPE	0	Type of interface of sub-net network card
ASK_MMT_SECURE_MODE	0	Secure mode
ASK_GRAPHIC_ACCELERATOR_TYPE	0	Type of graphic accelerator
ASK_MX_REFRESH_RATE	0	Refresh rate of AGX / UGX GRAPHIC CARD

Table 6-1



Please, keep in mind, that an entry set to zero does not disable the respective feature. But its properties are not questioned during custom configuration.

6.1.5 X server parameters

If you want to make changes to the graphical user interface X.11, which are not supported by the configuration tools introduced in section [3.4.2 X.11 configuration](#), you can manipulate the appearance and the properties of X.11 with a number of options.

On TRANSFORM A there are manual pages about the Xserver available. For reading these man pages enter **man Xserver** in the command line:

```
# man Xserver
```

Additional options are listed in the table below:

-no_cursor_on_video	The cursor becomes invisible, as long as it is moved over videos.
-ddc_all	DDC detection is asked for every graphic channel. Each graphic channel needs up to 6 seconds for detection. Therefore this should not be used as a standard, see section 4.8.2 DDC utility .
-no_ddc	DDC detection is not done at all.
-DRGB_888	All RGB sources of the DUAL RGB INPUT CARD are digitized and transferred to the OMNISCALE with 24 bpp (RGB 8:8:8) instead of the default setting with 16 bpp (RGB 5:6:5). Restarting the X server without this option resets the default settings.
-DDVI_888	Sources of type 3, 4 of the DUAL DVI INPUT CARD are digitized and transferred to the OMNISCALE with 24 bpp (RGB 8:8:8) instead of the default setting with 16 bpp (RGB 5:6:5). Restarting the X server without this option resets the default settings.
-new_video_layout	Configures in a distributed system to each video adapter its own video channel. For usage of logical video channels please refer to section 3.4.3 Configuring a distributed system and 6.1.6 Advanced configuration of TransForm A .
-noise_reduction <level>	Sets the noise reduction level for all video clients of QUAD ANALOG VIDEO CARD FRG-3292 . Integer values in the range from 0 to 16 can be specified. Optimal noise reduction has to consider the content of the displayed source. 0 off, no noise reduction 1 most modest level of noise reduction 12 default value 16 maximum value If the option is not set, the default value of 12 is applied.

Table 6-2

The desired options must be entered manually each in a single line in the file:

```
/etc/MMTconfig/MMTServerConfig
```

Subsequently the X Server must be restarted to make the above changes effective.

X Server parameters that shall not be changed at a new run of the script **EOSconfig** can be entered between the two lines:

```
# BeginSection Private
# EndSection
```



The file MMTServerConfig already contains lines inserted automatically by the configuration script. Do not change these entries manually.

6.1.6 Advanced configuration of TransForm A

The geometry of the rendering machines, the assignment of video and graphic channels, the REMOTE-CONTROL hot-keys and the configuration of the projection channels are defined in the configuration file of TRANSFORM A:

`/etc/MMTconfig/MMTConfigSections`

The file MMTConfigSections consists of up to five sections: geometry, video, channels, rctrl and osiris.

geometry

This section starts with the keyword `geometry` and defines the geometry of the rendering machines in a distributed system and the color depth and visual class of the rendering machines with multiple logical screens. This geometry section must not be changed manually, but it is configured by means of the X.11 configuration script **EOSconfig**, please refer to sections [3.4.3 Configuring a distributed system](#) and [3.4.4 Configuring a distributed system with multiple logical screens](#). General information about multiple logical screens can be found in section [4.1 Multi-screen capability](#).

With multiple logical screens an individual color depth and visual class can be assigned to each screen. Multiple logical screens can be used in two different modes: Separate-screens or Contiguous-screens. These modes differ only in the behavior of the cursor and in the demands of the arrangement of projection cubes.

The contiguous-screens mode is used if multiple screens shall be displayed on one display wall. The screens must completely fill the rectangular array of the display wall. The cursor can be moved continuously over all screens on the whole display wall. In the geometry section the keyword `ContiguousScreens` must be written in a line. The following lines contain each a rendering machine (`engine-x`), the module arrangement (`m×n`), the position within the display wall (`X Y`) and optional the color depth (`bpp xx`) and visual class (`cc x`). The visual class may have the values 3 (pseudo color), 4 (true color) or 5 (direct color). Please see section [4.2.2 Color capabilities](#) for the possible color settings. All screens where not explicitly color depth and visual class is assigned use the settings of the X server configuration.

```
geometry
```

```
ContiguousScreens
```

```
engine-0  2x1  0 0  bpp 16  cc 4
engine-1  1x1  2 0  bpp 16  cc 5
engine-2  3x1  0 1
```

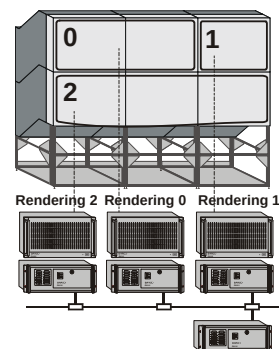


Figure 6-11
Three independent screens in contiguous mode
(The examples each are shows in an OmniBus configuration)

The separate-screens mode allows displaying multiple screens on multiple display walls and single projection modules. Nevertheless it is required, that the pixel resolution of each projection module that is used to display the different screens is identical.

To use separate-screens the keyword `SeparateScreens` must be written in a line of the geometry section. As with contiguous-screens each following line contains the information of one screen, but the position must not be indicated.

With separate-screens the cursor is first displayed on screen 0. Moving the cursor out of screen 0 to the right lets the cursor enter screen 1 on the left side. It will enter screen 1 on the same ratio of height as it has left screen 0. This can be continued until the screen with the highest number displays the cursor. Moving out to the right usually brings the cursor again on screen 0. This can be prevented by the keyword `NoCursorWrap`. This keyword can be inserted in any single line of the geometry section.

geometry

`SeparateScreens`

`engine-0 4x2 bpp 16 cc 5`

`engine-1 1x1`

`engine-2 2x2`

`NoCursorWrap`

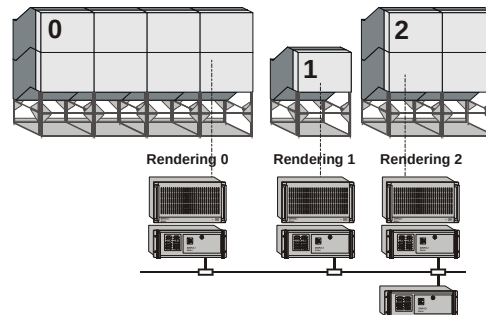


Figure 6-12
Three independent screens in separate mode

video

This section starts with the keyword `video`. The system stores in this location the configuration of the logical video channels of a distributed system. Please refer to section 4.6.2 [The video channels](#) for a basic explanation of video channels. The video section must not be changed manually, but by means of the script **EOSconfig**, see section 3.4.3 [Configuring a distributed system](#). The way the configuration is written in this section is identical to the way you have to specify the configuration in **EOSconfig**. Therefore you find here an instruction about it.

The syntax of the video section is as follows:

- For each rendering machine, there must be a single line starting with the rendering machine's name: e. g. **engine-1**.
- In this line the video adapters of this rendering machine must be listed. The position where the entry of an adapter is located defines the corresponding video channel.
- The first position in the line corresponds with video channel 1, the second position with video channel 2 etc.
- The entries in one line are separated by a space.
- If no video adapter of that rendering machine uses a particular video channel, then a **0** has to be in that position.
- If multiple rendering machines have an entry for a video adapter at the same position, this means that these adapters form together a logical video channel.
- There may be blank lines and comments starting with a **#** character for better clarity. It is e.g. helpful to have a commented line that lists the available video channels and makes the positions for the video adapters more obvious.



You may not mix adapters of input cards of different type to one logical video channel. Quad Analog Video Card FRG-3292 and Quad Analog Video Card R9842986 are also input cards of different type.

Dual RGB Input Cards and Streaming Video Cards may not be used to set up a logical video channel.

By default there is no video section and a standard assignment is applied, see section 4.6.2 [The video channels](#). This standard assignment numbers the individual video adapters in the order of the PCI slots, beginning in the order of the rendering engines. This means at first the video adapters of the first rendering machine are numbered in the scanning order of the PCI slots, followed by the video adapters of the second rendering machine, etc.

With this standard assignment, a video is restricted to the display area of the rendering engine where the input card is located. Combining a video adapter of one rendering machine with a video adapter of the same type in a different rendering engine to a logical video channel allows displaying the connected video source in a window that is freely movable and displayable across both display areas. A logical video channel may contain a video adapter of every rendering engine, enabling to move this video on the whole display wall.

If considering a distributed system with two rendering machines, each equipped with one QUAD ANALOG VIDEO CARD, the default configuration would correspond to an entry in the video section like this:

video

```
# channel: 1 2 3 4 5 6 7 8
engine-1  1 2 3 4 0 0 0 0
engine-2  0 0 0 0 1 2 3 4
```

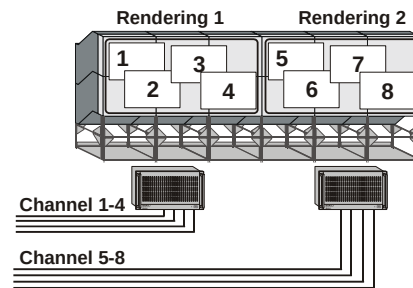


Figure 6-13

In the above example, eight different videos can be displayed simultaneously (**channel: 1 2 3 4 5 6 7 8**). (Note: The number of video channels is not defined in the comment line, but by the number of entries following the rendering machines' names.) Four videos can be displayed on the left part of the display wall by the four adapters of the first rendering machine (**engine-1**). The other videos can be displayed on the right part of the display wall by the four adapters of second rendering machine (**engine-2**).

A configuration of the same system that enables two logical video channels could look like this:

video

```
# channel: 1 2 3 4 5 6
engine-1  1 2 3 4 0 0
engine-2  0 0 3 4 1 2
```

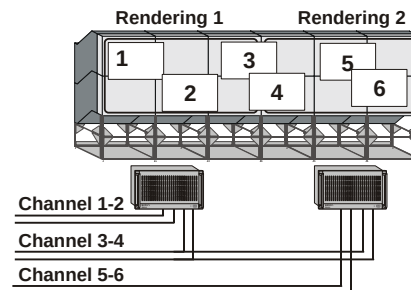


Figure 6-14

In the above example, two video channels (**channel 3** and **channel 4**) are »logic« video channels. They can be displayed and moved over the complete display wall. One logical video channel is setup with the adapters 3 of both rendering machines the other logical video channel is setup with the adapters 4 of both rendering machines. Channel **1**, **2**, **5** and **6** can be displayed within the left part of the display wall, respectively within the right part only.

The control panel of the video client lists the video channels according to the order of the input cards in the system. When configuring logical video channels these logical video channels are listed as first channels in the control panel for that type of video. The video channels that are used to set up a logical video channel cannot be addressed separately any longer. Therefore the absolute amount of selectable video channels decreases. Anyhow the control panel shows the maximum amount of video channels per input card but the cards as mentioned in the control panel do not refer to the physical cards in the system.

channels

This section starts with the keyword `channels` and defines the assignment of graphic channels to projection channels. This section must not be changed manually but by aid of the script **EOSconfig** (channel reordering), see section 3.4.2 X.11 configuration.

If this section is not existing, the standard assignment, as described in section 3.2.5 Graphic cards is effective.

The graphic channel (physical channel) is defined by the order of the graphic card and the port number. The number of the projection channel indicates the place where the data has to be displayed (logical channel). Usually graphic channels and projection channels have the same numbering (see section 3.2.5 Graphic cards, please). Anyhow depending on the configuration it might be useful to reorder the graphic channels and to connect the projection modules with the respective ports of the graphic cards. The following example should point up the operating:

Two OMNIBus devices are used to display graphic and video on a 4x3 display wall. Thereby some videos shall be movable on the left part of the wall, others on the right part of the wall.

Each OMNIBus is equipped with graphic cards, OMNISCALERS and input cards. With the standard ordering, the first six modules would be controlled by the first OMNIBus (counted line by line, starting in the upper left corner). OMNIBus 2 would control the remaining six modules in the lower part of the wall. The video windows could only be displayed in one of these areas. The figure below shows the standard ordering. The graphic channels of OMNIBus 1 are illustrated bright, graphic channels of OMNIBus 2 are illustrated dark.

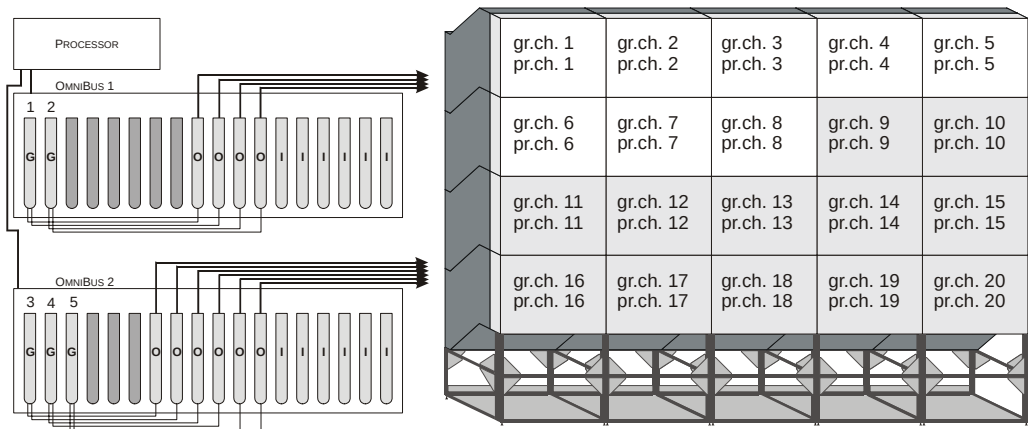


Figure 6-15
standard numbering of graphic and projection channels

And with a possible new numbering of the graphic channels, enabling to split the display wall in a left and a right side, as indicated in the figure and table below:

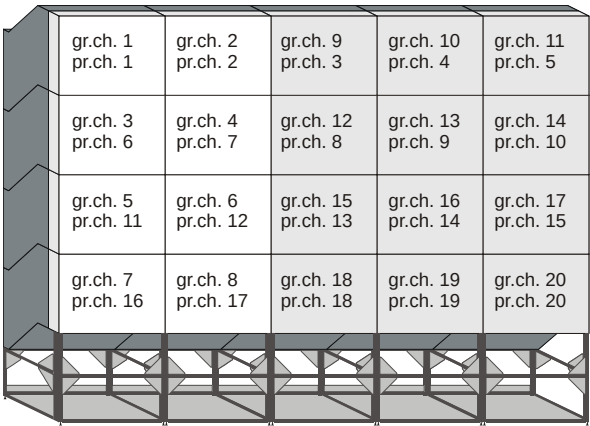


Figure 6-16
reordered numbering of graphic and projection channels

board port	1				2				3				4				5			
	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
graphic channel	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
projection channel	1	2	6	7	11	12	16	17	3	4	5	8	9	10	13	14	15	18	19	20

Table 6-3
Relation between board, port,
graphic channel and projection channel

The entry in the configuration file just concerns the channels that differ from the default configuration. Therefore the graphic channels 1, 2, 18, 19 and 20 are not indicated (Port 0 of Board 1 still displays the information of the leftmost projection cubes on the top). Graphic channel 3 (Port 0 of Board 2) shall display the information of the leftmost projection cubes on the middle row and is therefore correlated with the projection channel 6 etc.

You may insert blank lines and comments starting with a # character for better clarity.

```
channels
# graphic channel numbers
3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
# projection channel numbers
6 7 11 12 16 17 3 4 5 8 9 10 13 14 15
```

Reassigning a system with rendering machines, the name of the concerned rendering machine has to be mentioned as well.

```
channels

engine-2
# graphic channel numbers:
1 2 3 4
# projection channel numbers:
2 3 4 1
```

```
engine-3
# graphic channel numbers:
2 3 4
# projection channel numbers:
4 2 3
```

The graphic channels of the rendering machine 1 and the graphic channel 1 of the rendering machine 3 remain unchanged. It is just possible to reassign the channels within the displayed area of a rendering machine. To change size or place of the displayed area see section [3.4.3 Configuring a distributed system](#), please.

rctrl

This section starts with the keyword `rctrl` and defines the hot-keys for Remote-Control. If the `rctrl` section does not contain any data, the default setting applies:

```
rctrl
#rctrl_enable    1
#rctrl_key_1     XK_Control_L
#rctrl_key_2     XK_Shift_L
#rctrl_host      host-name
#rctrl_port      13579
#rctrl_wall      1
#rctrl_switch    1
```

entry	argument meaning	default
<code>rctrl_enable</code>	0 1 Activates/deactivates hot-keys.	1
<code>rctrl_key1</code>	Defines first key for hot-keys.	XK_Ctrl_L
<code>rctrl_key2</code>	Defines second key for hot-keys.	XK_Shift_L
<code>rctrl_host</code>	<hostname> Specifies hostname or IP address, where the <code>rctrl</code> daemon is started.	local host
<code>rctrl_port</code>	<port> Specifies port of the <code>rcrld</code> daemon. (Default should not be changed!)	13579
<code>rctrl_wall</code>	<displayWall> Specifies type of OVERVIEW display wall 1 OVERVIEW-ML 2 OVERVIEW-MP, ATLAS67C4-PSI 3 OVERVIEW-MD	1
<code>rctrl_switcher</code>	<switcherType> Specifies type of multiplexer 1 HERMES V2A, HERMES VXA, HERMES D2D, HERMES DXD	1

Table 6-4

For `rctrl_key1` and `rctrl_key2` all key codes, defined within the X.11 **include file** `keysymdef.h` can be specified. The hot-keys for TRANSFORM A are listed in section [4.7.4 Hot-keys](#).

osiris

This section starts with the keyword `osiris` and defines configuration parameters for OSIRIS. It is only added, if OSIRIS is installed on the system. This section should not be changed manually.

6.1.7 Redundant network adapter

To obtain a redundant network connection to the LAN the PROCESSOR can be equipped with multiple network cards or onboard LAN adapters, which form an AFT (Adapter Fault Tolerance) team. A team consists of two or more network adapters of the same type. At least one of the adapters must be a server adapter. The other ones can be server or desktop adapters. Nevertheless we recommend to use for a redundant network adapter exclusively server adapters to achieve an easy spare part handling. A team has an active (primary) adapter and one or more secondary adapters. The primary adapter is the network adapter that is used by default for data transfer. One of the secondary adapters is only used if a fault occurs that prevents data transfer via the primary adapter. Whether the primary adapter is a server adapter or not is of no importance but all adapters of a team must be either exclusive 100 Mbps network cards or exclusive 1000 Mbps network cards or onboard LAN adapters of AGS-3390-2.

Configuration of an AFT team

To form a team of network adapters the script **config** can be used. Therefore log in as **root** and change to the directory **/opt/MMT2686/iAns**. The factory set password for root is **barco**.

```
eos login: root
Password: barco
[root@eos root] # cd /opt/MMT2686/iAns/
```

Start the script by entering **./config**:

```
[root@eos config] # ./config
```

The script will prompt you to select the network adapters that are part of the team. The network adapters are named **eth0**, **eth1**, etc. This numbering follows the reverse order of the PCI slots in which the cards are inserted, please refer also to section [3.2.13 Network](#). Nevertheless it might be more convenient to first check the names of the network adapters by means of the **procfg** utility, see section [4.8.7 Network reporting utility \(procfg\)](#).

Below you can read through a typical course of the configuration script expanded with comments giving more details:

```
*****
*
*   BARCO iANS configuration script
*   =====
*   The configuration process will now ask you to enter your
*   selection for the Intel(R) Advanced Network Services (iANS)
*
*****

Do You want to continue([Y]/n): y
```

First enter **y** to start with the configuration. In the following the script presents you a list with the available network adapters. You are prompted to select the network adapters that form one team. The AFT team of TRANSFORM A is called **bteam0**. First enter the number of the network adapter that shall be the primary adapter. A new list is shown but without the already selected adapter. Enter the number of the next member of the team. When all team members are selected enter **0** to continue with the configuration.

```
Select members for team bteam0:
0. done
1. eth0
2. eth1
3. eth2
1

Select members for team bteam0:
0. done
1. eth1
2. eth2
1

Select members for team bteam0:
0. done
1. eth2
0
```

Enter the IP address and netmask for the team (virtual adapter). This is in general the same IP that was indicated in the system configuration.

```
Enter ip address for virtual adapter [192.168.1.1]: 192.168.1.1
Enter netmask for virtual adapter [255.255.255.0]: 255.255.255.0
```

```
Chosen values:
Virtual adapter members:      eth0 eth1
IP address:                   150.158.181.176
Net mask:                     255.255.254.0
Are you sure (y/n)? y
```

```
*****
*                               *
*   BARCO iANS Configuration completed successfully.   *
*                               *
*****
```

When confirming the selected values with **y** the AFT team will be configured, else you will exit the script without changes.

Revoking an AFT team

The members of an AFT team can be released as well. To achieve this log in as **root** and change to the directory **/otp/MMT2686/ians** like explained above and run the script **unconfig**:

```
[root@eos ians] # ./unconfig
```

After confirming to unconfigure the AFT team with **y**, the script revokes the team. The network adapters of the team get the same IP address and netmask they had before building the team:

```
You want to continue([Y]/n): y
unconfig: ...done
```

6.1.8 Mapping of USB devices – hot-plug detection

The PROCESSOR supports hot-plug detection of USB devices. After connecting a USB device it has to be mounted. Irrespective of the connected USB mouse or keyboard devices it has to be mounted as the first SCSI device. Memory sticks, which usually use the FAT file format, require in addition the option `-t vfat`. Thus the following command must be used to mount an additional device:

```
mount/dev/sda1 -t vfat /mnt/usb
```

If using several additional USB devices the SCSI devices are numbered consecutively.

Enabling/Disabling hot-plug detection

Hot-plug detection is by default enabled, but the system can be configured to change this setting permanently or temporarily.

To disable hot-plug detection permanently enter the following to the command line and reboot afterwards:

```
chkconfig hotplug on
```

To enable hot-plug again enter the following and reboot:

```
chkconfig hotplug off
```

To change the setting only during the runtime of the system the service-utility can be used by entering

```
service hotplug stop
```

to switch hot-swap off and

```
service hotplug start
```

to switch hot-swap on. But after a reboot the last configuration of `chkconfig` will be valid again.

6.1.9 Nearby color allocation

In order to ensure that X clients can allocate their colors in 8 bit PseudoColor mode even if the color map is already filled completely the Nearby Color Allocation has been implemented: If an X client requests a shared color and the X server is not able to allocate this color exactly, it decides to return a color that is »nearby« the requested one.

Nearby Color Allocation can be applied optional, whether by a command line parameter on start up of the X server (option mode) or by specifying a file with a set of predefined colors (file mode).

Option mode

Nearby Color Allocation is used if the color table is full or if there are more than a given number of colors contained in the color table. The number of colors in the color table up to that colors are allocated by exact match strategy is set by the following command line parameter:

`-nearby <n>`

If the color table already contains <n> colors further allocation of shared colors will be carried out using Nearby Color Allocation strategy. Values between 16 and 256 are allowed.

A certain amount of colors can be reserved as private colors for X clients that are to be started later.

File mode

The environment variable `NEARBY_FILE` specifies the name of a file that contains the definition of shared colors. The environment variable `NEARBY_FILE` is only considered if the command line parameter `-nearby` is not set. The number of entries in the file specifies the parameter <n> in that case.

If neither `-nearby <n>` nor `NEARBY_FILE` is set the X server searches for the file named `nearby` in the following directory:

`/etc/MMTconfig/nearby.def`

If the file `nearby.def` cannot be found color allocation will be carried out using standard-strategy that means using exact-matching-strategy.

The `nearby` configuration file contains in the first line the keyword `COLORCELLS` separated by a blank from the number of colors defined in the following lines, e. g.:

`COLORCELLS 135`

In the following lines the RGB values are defined in hexadecimal notation, separated by blanks and within a range of 0 to 0xFF. Lines beginning with the character `#` are considered to be comments. E. g.:

```
# red:
FF 00 00
# green:
00 FF 00
# blue:
00 00 FF
# grey:
32 32 32
```

In file mode all specified colors are allocated as shared color cells on start up of the X server. By specifying a balanced set of colors you can avoid color distortions as they may appear in option mode if e. g. only shades of blue have been allocated and yellow is requested.

In the file `nearby.def` a maximum of 256 colors can be specified. If there is a need for private cells, only a correspondingly smaller number of colors may be defined.

6.1.10 BIOS settings for TransForm A Processor

On a TRANSFORM A PROCESSOR the BIOS of the mainboard must have some settings different to the default BIOS settings to achieve a system that optimally supports the TRANSFORM A hard- and software. The BIOS settings depend on the type of the TRANSFORM A PROCESSOR.

BIOS for AGS-3389-0/-1/-2/-3

With AGS-3389-0/-1/-2/-3 please make sure that the following BIOS parameters are set as given below:

Main	Boot Options	Quiet Boot:	Disabled
		Primary Display:	PCI
	Boot Sequence:	+Diskette	
		CD-ROM Drive	
		+Hard Drive	
		Legacy LAN Card	
Advanced	Peripheral Configuration	ATA Controller Config	S-ATA Mode: Compatible for PATA hard disks Native for SATA hard disks
			P-ATA Maps To: Primary for PATA hard disks Secondary for SATA hard disks
		LAN Controller:	Disabled
		Audio Controller:	Disabled
		Hyper-Threading:	Disabled
	Advanced System Configuration	NX Memory Protection:	Disabled
Power	ACPI Save To RAM:	Disabled	
	Power On/Off	LAN:	Disabled
		Power Failure Recovery:	Disabled



If using the solid stated drive, the setting of the S-ATA Mode may not be changed after the installation. The system will not boot with this setting changed.

BIOS for AGS-3390-2

With AGS-3390-2 please make sure that the following BIOS parameters are set as given below:

Advanced	Boot Features	Quiet Boot Mode:	Disabled
		Power Loss Control:	Stay Off
		POST Errors	Disabled
	PCI Configuration	Default Primary Video Adapter:	Other
		ROM Scan Ordering:	Addon First
	Hardware Monitor	Fan Speed Control Modes:	5) 4-pin (Workstation)
	Processor options	execute disable bit	Disabled
Boot	1. Legacy Floppy Drives		
	2. IDE CD		
	3. IDE 0		

BIOS for AGS-3328-2/-3

With **AGS-3328-2/-3** please make sure that the following BIOS parameters are set as given below:

Main	Boot Options	Quiet Boot:	Disabled		
		Primary Display:	PCI VGA		
		Boot Sequence:	+Diskette		
			CD-ROM Drive		
Advanced	Peripheral Configuration		+Hard Drive		
			Legacy LAN Card		
		Serial ATA Configuration	S-ATA Interface:	Disabled	
		LAN Controller:	Disabled		
Power	Advanced System Configuration	Audio Controller:	Disabled		
		Graphics Aperture:	32M		
		APM Power Saving:	Disabled		
		ACPI Save To RAM:	Disabled		
		Power On/Off	LAN:	Disabled	
			Power Failure Recovery:	Disabled	

6.1.11 BIOS settings for rendering machines

In a distributed system that is delivered with X server release 3.48 or newer, the BIOS of the mainboards of the rendering processors is already configured to enable Wake On LAN (WOL). If you want to check the settings or if it is necessary to enable WOL for another reason (e.g. if you want to use the onboard LAN adapter and to remove the rendering network cards with Etherboot mechanism, please refer to section [3.2.13 Network](#)) you can do the following provided that you have a model of a PROCESSOR with order number **E05-3026-5**, **E05-3327-2** or **A6S-3328-2** or higher:

- Switch off the complete TRANSFORM A system, please refer to section [3.3.3 Switching off](#), but leave the power switch [35] of the rendering processor on.

Repeat the following for all rendering processors:

- Connect a keyboard to the rendering processor
- Switch on this rendering processor by its power button [13] at the front.
- The device starts booting. On one channel of the display wall its graphical output is displayed. As soon as the system offers to enter the BIOS, press the **F2**-key.
- In the BIOS take care that the following settings are selected:

Power

Power On/Off

LAN: **Enabled**

Power Failure Recovery: **Previous State**

- If using the onboard LAN adapter, check that its use is enabled in the BIOS.

Peripheral Configuration

LAN Controller **Enabled**

- Save the BIOS settings and exit the BIOS.
- Switch off the device by its power button [13] at the front.
- Disconnect the keyboard

After configuring all rendering processors, you can switch on the whole system again, please refer to section [3.3.2 Switching on](#).

6.1.12 Configuration of 1×2 XGA settings

TRANSFORM A enables controlling of two display devices from one TRANSFORM A output. Thus one UGX GRAPHIC CARD is able to control eight projection modules altogether. This is called **1×2 XGA settings**.

One graphics signal of TRANSFORM A contains the display information for two projection modules with XGA resolution (1024×768 pixels), which results in a timing with 1024×1536 pixels. The graphics card connects just to one of the projection modules, this module displays only its part and loops through the unchanged signal to the second projection module, which displays the other part of the signal.

System requirements

The following conditions have to be met to allow 1×2 XGA settings:

- The resolution of a projection module must be XGA (1024×786 pixels).
- The projection modules must support 1×2 XGA settings with an input signal of 1024×1536 pixels and loop through functionality.
- Only projection modules which are positioned on top of each other can form a couple and use one graphics channel commonly.
- The graphics cards in TRANSFORM A have to be UGX GRAPHIC CARDS
- Only display walls with an even number of rows can be used for 1×2 XGA settings.
- In general the upper projection module is connected to the output channel of TRANSFORM A; the lower projection module is connected to the loop-through output of the upper projection module.

Setup

When configuring the projection modules for 1×2 XGA settings their DDC information is changed from XGA (1024×768 pixels) to Dual-XGA (1024×1536 pixels). Please refer to the corresponding user documentation of the projection module for 1×2 XGA setting. According to the DDC information, the UGX GRAPHIC CARD will adjust its timing automatically to Dual-XGA. The figure below illustrates the resulting default graphic channels and shows the default cabling for a 4×4 display wall.

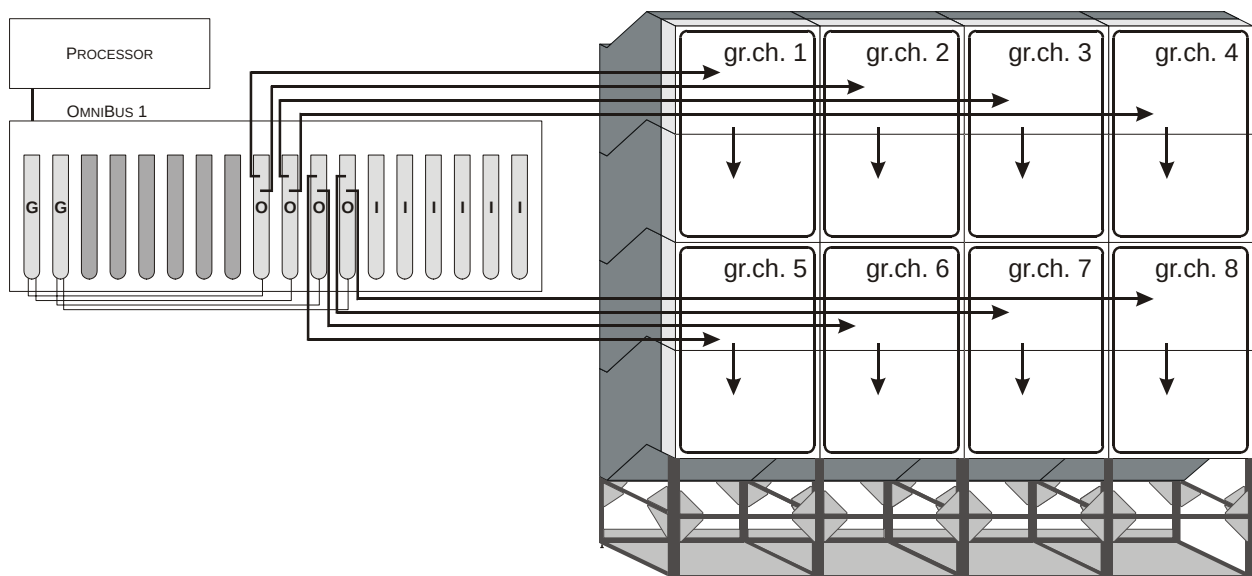


Figure 6-17
cabling and graphics channels for 1×2 XGA settings

Configuration

For the X.11 configuration (please refer to section [3.4.2 X.11 configuration](#)) a couple consisting of two projection modules is consistently treated as one graphic channel. The suitable X.11 configuration that corresponds to the figure above would be:

```
Configuring the Monolithic X Server Multiscreen Arrangement
-----
Enter the Multi Screen Arrangement (Width x Height) [2x1]: 4x2
```

and

```
Channel Reordering:
-----
1: redefine reordering
2: take default (no reordering)
Enter selection [1]: 1
Enter the list of the default channels [1 2]: 1 2 3 4 5 6 7 8
Enter the list of the new channels [2 1]: 1 2 3 4 5 6 7 8
```

This applies also for the respective settings when configuring a distributed X server or multiple logical screens.

6.1.13 Plain video mode

Alternatively to the standard configuration where always OMNISCALER are used to display video or RGB input data, this section describes a possibility to display video and RGB data in a system without OMNISCALERS. This is further referred as **plain video**.



Plain video is only recommended for systems where few video or RGB windows shall be shown, where those windows do not need to be upscaled.

System requirements

For plain video mode the following system requirements have to be fulfilled:

Release X Server	release 4.3 or higher
Hardware	UGX GRAPHIC CARD with QUAD ANALOG VIDEO CARDS, QUAD SDI VIDEO CARDS, STREAMING VIDEO CARDS, DUAL DVI INPUT CARDS and/or DUAL RGB INPUT CARDS
Depth resolution and Visual class	The visual class must be set to TrueColor . One of the following settings can be configured: 2 - for 16 bpp (64K colors) 3 - for 32 bpp (16M colors) 4 - for 8 and 16 bpp (MultiDepth/MultiColor: Default visual = PseudoColor) 5 - for 16 and 8 bpp (MultiDepth/MultiColor: Default visual = TrueColor) Please refer to section 3.4.2 X.11 configuration, subsection Depth resolution .

Table 6-5
System requirements for plain video

Bandwidth considerations

Plain video is more restrictive towards bandwidth consumption. Therefore you should first check the feasibility of a configuration. Please check section 4.6.1 The input cards for the principal understanding of the calculation of bandwidth consumption. The column **bandwidth per window [MBps]** of the Table 4-5 provides bandwidths of the most common content types; the proximate formula helps to check the feasibility of a configuration. The overall available bandwidth when using plain video mode per monolithic system and rendering machine respectively can be assumed as given in the table below:

Device	Available bandwidth
OmniBus A12	120 MBps per OMNiBus device
Processor AGS-3390-1/-2	120 MBps
Processor AGS-3389, AGS-3328	60 MBps

Table 6-6
Available average bandwidth with plain video



Usage of one of the 16bpp visual classes (setting 2, 4 or 5 see above) is recommended for plain video. 32bpp is only foreseen for special applications as it consumes double the bandwidth of 16bpp!

Hardware configuration

For best performance the plugging order of expansion cards in the OMNIBus A12 should be considered. Cabling is explained in the service manual; anyhow for plain video mode the following exceptions should be made:

Having an OMNIBus A12 with six or less expansion cards:

- Only the PCI slots with odd numbers are used.
- First the graphic cards are inserted in ascending order in each second PCI slot, beginning with the PCI slots with the lowest numbers at the very left (slot 1, 3, 5, ...)
- The input cards are inserted consecutively in the following slots with odd numbers (slot ..., 7, 9, ...)

Having an OMNIBus A12 with seven up to twelve expansion cards:

- The expansion cards are inserted as described in the service manual with the only difference that the OMNISCALERS are omitted.



Respect the other general instructions for insertion of expansion cards given in the Service manual!

Make sure that any actions at the open device are carried out by qualified service personnel.



These rules are a suggestion for best performance for an OMNIBus A12 in plain video mode. For special requirements also some subtle configurations might exist. In case of doubt contact the Barco support; please refer to section [8.3 Hot line](#).

Functionality of video/RGB windows

Video windows of plain video behave the same way like standard video using OMNISCALERS, except for the following items:

- **Upscaling**
Video data can only be displayed 1:1 or downscaled.
Downscaled window content requires less bandwidth. Therefore only the actually displayed pixels must be considered when calculating the bandwidth.
- **Resizing**
Resizing is only useful as long as the video window is not larger than the standard size.
- **Visual class**
Only the visual class TrueColor 16bit or 32bit supports plain video mode
- If using multiple OMNIBus A12 devices, a video can only be displayed on the projection modules that are connected to the graphic cards of that device that contains also the input card of that video.

6.1.14 System watchdog auto restart

The X server is delivered with two programs that are used to keep a watch on the connection between a host and the PROCESSOR and to reset the PROCESSOR, if necessary:

- **argusreset** is a client running on the host and monitors the connection between host and PROCESSOR.
- **argusd** is a server running on the PROCESSOR.

Client and server communicate via a socket connection. The client sends cyclical in the configurable time interval a control packet to the server. Independent from that the server increases the value of a counter after a time interval. Each time the server receives a packet the counter is set to zero again. If no packets reach the server the counter exceeds a limit. In this case it is assumed that the connection is broken and the server initiates a reset.

argusreset

To use the client first copy the file `argusreset` from the path `/usr/bin/` of the PROCESSOR to the client computer. Then the client can be started with the following command line options:

```
argusreset [ -c -p port -t time -n timeout -v -y ] <ip-address>
```

Option	meaning
-c	If the parameter -c is set, the values time and timeout are transferred to the server to activate controlling.
-p port	specifies the port Default: 13456
-t time	This parameter sets the time passing before the client sends the next packet. Values are valid between 1 and 32 000 seconds. Default: time = 5
-n timeout	This parameter sets the limit. If the counter in the server exceeds the value timeout reset of the PROCESSOR is carried out. Values are valid between 5 and 32 000. Default: timeout = 10
<ip-address>	sets the ip address of the PROCESSOR. As an alternative the hostname can also be set.
-v	switches verbose on
-y	Prior to reset a question is asked whether the reset should be carried out or not, if the parameter -y is not set. If <code>argusreset</code> is started with -y set, reset is carried out without remark.

There are two main-usages of `argusreset`:

- Started with the options `-p` and `<ip-address>` only, resets the PROCESSOR at once.
- Started with the options `-c -p -t -n <ip-address>`, activates controlling.

One can deactivate the client `argusreset` with `<Ctrl-C>` (SIGINT). The client sends a message about deactivation to the server. No deactivation message is sent for all other interrupts.

argusd

The server can be started with the following command line options:

```
Argusd [-p port]
```

Option	meaning
-p port	specifies the port Default: 13456

Port address of server and client must be identical.

Up to five clients may connect to the server. When starting an additional client, the values for **time** and **timeout** are only modified in the server, if the new values are higher than the old ones. The PROCESSOR is only reset, if all connections between clients and server are broken. If several clients send control packets, then one missing connection does not lead to a reset of the PROCESSOR.

7 Technical appendix

This chapter provides tabular overviews about the technical details of TRANSFORM A, its components and of their interfaces.

7.1 Technical data

Processor

dimensions (h/w/d)	177mm/440mm/516mm 6.97 in./17.32 in./20.32 in. (AGS-3328, AGS-3389) 177mm/440mm/566mm 6.97 in./17.32 in./22.28 in. (AGS-3390-2)
dimensions (h/w/d) with rubber feet, fixation, handling	183mm/482mm/566mm 7.20 in./18.98 in./22.28 in. (AGS-3328, AGS-3389) 183mm/482mm/616mm 7.20 in./18.98 in./24.25 in. (AGS-3390-2)
weight with standard power supply	18.0 kg 39.7 lbs. (AGS-3328-2, AGS-3389-0/-2)
weight with redundant power supply	20.5 kg 45.2 lbs. (AGS-3328-3, AGS-3389-1/-3) 22.3 kg 49.2 lbs. (AGS-3390-2)
power mains	100-240V, 60Hz/50Hz
power consumption	
standard power supply	400 W
redundant power supply	400 W
operating conditions	0 .. 40° Celsius at max. 80% humidity, non condensing

Table 7-1

OmniBus A12

dimensions (h/w/d)	177mm/440mm/450mm 6.97 in./17.32 in./17.72 in.
dimensions (h/w/d) with rubber feet, fixation, handling	183mm/482mm/500mm 7.20 in./18.98 in./19.69 in.
weight	18.2 kg 40.1lbs.
power mains	100-240V, 60Hz/50Hz
power consumption	600 W
operating conditions	0 .. 40° Celsius at max. 80% humidity, non condensing

Table 7-2

OmniBusA18

dimensions (h/w/d)	267mm/449mm/420mm 10.51 in./17.68 in./16.54 in.
dimensions (h/w/d) with rubber feet, fixation, handling	270mm/482mm/461mm 10.63 in./18.98 in./18.15 in.
weight with standard power supply	19.8 kg 43.7lbs.
weight with redundant power supply	21.8 kg 48.1lbs.
power mains	100-240V, 60Hz/50Hz
power consumption	600 W
operating conditions	0 .. 40° Celsius at max. 80% humidity, non condensing

Table 7-3

Extender

dimensions (h/w/d)	177mm/440mm/450mm 6.97 in./17.13 in./17.72 in.
dimensions (h/w/d) with rubber feet, fixation, handling	183mm/482mm/500mm 7.20 in./18.98 in./19.76 in.
weight	16.5 kg 36.4lbs.
power mains	100-240V, 60Hz/50Hz
power consumption	400 W
operating conditions	0° .. 40° C at max. 80% humidity, non condensing
Interfaces	13 PCI slots for expansion cards 1 slot for connecting to the PROCESSOR

Table 7-4

UGX Graphic Card

graphic accelerator	4×Radeon 7500 with 4×32 MB RAM
local CPU	64-bit RISC processor with 64 MB SDRAM
resolution & colors (analog)	8bpp, 15 bpp, 16 bpp, 24 bpp, 32 bpp
640×480	85 Hz
800×600	85 Hz
1024×768	85 Hz
1152×864	84 Hz
1280×960	85 Hz
1280×1024	85 Hz
1600×1200	85 Hz
resolution & colors (digital)	8 bpp, 15 bpp, 16 bpp, 32 bpp; up to 1920x1080@60Hz or 1920x1200@50Hz
video output stage	pixel clock digital 165 MHz, pixel clock analog max. 350 MHz
bus connection	PCI bus, 32bit / 33 MHz, 64bit / 66 MHz
supply voltage	5 V (±5%), 3.3 V (±0.3 V)
current consumption	5 V / max. 2.5 A, 3.3 V / max. 1.6 A
operating conditions	0 .. 50° C at 8% - 80% humidity, non-condensing
dimensions	PCI long card 312.00 mm × 121.92 mm with ISA retainer and front plate 352.18 mm × 121.92 mm
weight	280 g
plugs	1 64/32bit, Dual Voltage Signaling PCI edge connector 2 Dual-DVI connector

Table 7-5

OmniScaler

video/RGB input format	YUV4:2:2, XRGB8:8:8:8, RGB8:8:8, RGB5:6:5
data input format	24 bpp PanelLink
data output format	24 bpp PanelLink in the resolution and timing of the input up to 1280×1024 AGX-3002 up to 1920×1200 AGX-3313
video source RAM	64 MB DDR SDRAM, 64 bit
bus connection	PCI bus, 32bit / 33 MHz, 64bit / 66 MHz
supply voltage	5 V (±5%), 3.3 V (±5%)
current consumption	5 V / 3.0 A, 3.3 V / 1.4 A
operating conditions	0 .. 50° C at 8% - 80% humidity, non-condensing
dimensions	PCI long card 312.00 mm × 121.92 mm with ISA retainer and front plate 352.18 mm × 121.92 mm
weight	250 g
plugs	1 64/32bit, Dual Voltage Signaling PCI edge connector 1 Dual-DVI connector in, 1 Dual-DVI connector out

Table 7-6

Streaming Video Card SVC-1

scaler	4 x Silicon Optix sxZX1 for 1:1 or downscaling
CPU-/Frame-Memory	64MB SDRAM
digital network carrier	Base-T Ethernet 10/100Mbps
compression algorithm	MPEG-1 ISO 11172 MPEG-2 ISO 13818 (MP@ML 4:2:0) DVB ETR 154 / SPTS / MPTS (the DVB format is MPEG-2 based) MPEG-4 part 2 ISO 14496-2 (SP@L3, ASP@L5) Bosch MPEG-4 (h263) MJPEG ISO 10918 MXPEG 2D Wavelet
video formats	PAL, NTSC
bitrate	1 - 4 streams and max. 44Mbps per board MPEG-1: up to 4 streams (all resolutions) MPEG-2: up to 4 D1 streams or 4 CIF streams, 44Mbps per board, max. 15Mbps per stream MPEG-4 part 2: up to 4 CIF streams or 3 2CIF streams or 1-2 4CIF streams, de- pends on resolution 32Mbps per board, max. 8Mbps per stream MPEG-4 h263: up to 4 CIF streams or 4 2CIF streams or 4 4CIF streams MJPEG: up to 4 CIF streams or 2-4 4CIF streams MxPEG: up to 4 CIF streams or 2 1280x576 streams Visiowave: 1-3 D1 streams or up to 4 CIF streams, depends on resolution TRANSFORM SCN: 1 stream MPEG-2: Bosch, Coretec, Cornet, Exterity, Fast Video Security, HaiVision, iMPath, Lanaccess, Mavix, NKF, NiceVision, Optelecom, Opti- base, Path1, PelcoNET, Siemens OTN, Tandberg, Teleste, Telin- dus, VBrick, VideoLAN, Vorx MPEG-4 part 2: Cieffe, Cornet, DVTel, Hi Tron, IndigoVision, Lanaccess, Mavix, NiceVision, Siemens OTN, Teleste, VBrick, Verint, VideoLAN, Vorex MPEG-4 h263: Bosch, PelcoNET MJPEG: AXIS, JVC, Lenel, VideoLAN MXPEG: Mobotix 2D Wavelet: GE Security, Visiowave TRANSFORM SCN: Barco
supported encoders	
network transmission protocol	UDP
connection protocols	RTP (variable header length, lost packet detection, non-video packet detection)
colors	IGMP v2 and v3 (multicast subscription)
bus	internal data path YUV 4:2:2 (16 bit wide)
power supply	PCI bus, 32bit / 33 MHz, 64bit / 66 MHz
power consumption	5 V ($\pm 2\%$), 3.3 V (± 0.3 V)
operating conditions	5 V / 2.2 A, 3.3 V / 3.4 A
dimensions	0 .. 50° C at 8 - 80% humidity, non-condensing
Weight	PCI long-card, 312.00 mm x 121.92 mm
connectors	480 g
	1 x 64 bit, 3.3 V/5 V PCI edge connector
	2 x RJ45 connector 8-pin for redundant connection

Table 7-7

Streaming Video Card SVC-2

scaler	via scaler algorithm in FPGA for 1:1 or downscaling
digital network carrier	Base-T Ethernet 10/100/1000Mbps
compression algorithm	MPEG-2 ISO 13818 (MP@ML 4:2:0) MPEG-4 part 2 ISO 14496-2 (ASP@L5) Visiowave
video formats	PAL, NTSC
bitrate	1 - 4 streams per board, stream resolution up to 4CIF or D1: MPEG-2: up to 15Mbps per stream MPEG-4 part 2: up to 8Mbps per stream
supported encoders	MPEG-2: iMPath, NKF MPEG-4 part 2: Acti, Axis, Cieffe, Coe, Coretec, Cornet, Hisome, Mavix, NKF, Teleste, Vbrick, Verint, VideoBridge Visiowave: VisioWave
network transmission protocol	UDP RTP / RTCP and RTSP
connection protocols	IGMP v3
colors	internal data path YUV 4:2:2 (16 bit wide)
bus	PCI bus, 32bit / 33 MHz, 64bit / 66 MHz
power supply	5 V ($\pm 2\%$), 3.3 V (± 0.3 V)
power consumption	5 V / 2.7 A, 3.3 V / 3.9 A
operating conditions	0 .. 50° C at 8 - 80% humidity, non-condensing
dimensions	PCI long-card, 312.00 mm x 121.92 mm
Weight	500 g
connectors	1 × 64 bit, 3.3 V/5 V PCI edge connector 2 × RJ45 connector 8-pin for redundant connection

Table 7-8

Quad Analog Video Card

video-decoder	4 x SAA7118E
de-interlacer	Median filter FPGA
scaler	via scaler algorithm in FPGA for 1:1 or downscaling
CPU-/Frame-Memory	64MB SDRAM
input formats	CVBS PAL B, D, G, H, I, N NTSC M, N, 4.43 SECAM
colors	internal data path YUV 4:2:2 (16 bit wide)
video standard	ITU-R601 and ITU-R656 compatible
bus	PCI bus, 64 bit, 3.3/5 V, max, 66 MHz
power supply	5 V ($\pm 2\%$), 3.3 V (± 0.3 V), 12 V ($\pm 10\%$), -12 V ($\pm 10\%$)
power consumption	5 V / 0.8 A, 3.3 V / 2.5 A
operating conditions	0 .. 50° C at 8 - 80% humidity, non-condensing
dimensions	PCI long-card, 312.00 mm x 121.92 mm
weight	425 g
connectors	1 × 64 bit, 3.3 V/5 V PCI edge connector 4 × BNC connector

Table 7-9

Quad SDI Video Card

scaler	4 x Silicon Optix sxZX1 for 1:1 or downscaling
CPU-/Frame-Memory	64MB SDRAM
input formats	NTSC 4:2:2 component 13.5MHz Y sampling PAL 4:2:2 component 13.5MHz Y sampling
colors	internal data path YUV 4:2:2 (16 bit wide)
video standard	SMPTE 259M-C (270Mbps, 4:2:2) compliant
bus	PCI bus, 32bit / 33 MHz, 64bit / 66 MHz
power supply	5 V ($\pm 2\%$), 3.3 V (± 0.3 V), 12 V ($\pm 10\%$), -12 V ($\pm 10\%$)
power consumption	5 V / 1.9 A, 3.3 V / 1.8 A, -12 V / 20 mA
operating conditions	0 .. 50° C at 8 - 80% humidity, non-condensing
dimensions	PCI long-card, 312.00 mm x 121.92 mm
connectors	1 x 64 bit, 3.3 V/5 V PCI edge connector 4 x BNC, 1 x RJ45 connector 10-pins (not used)

Table 7-10

Dual DVI Input Card

A/D converter	2 x Analog Devices AD9888
scaler	via scaler algorithm in FPGA for 1:1 or downscaling
CPU-/Frame-Memory	64MB SDRAM
input	Dual input mode (up to HDTV 1920×1080@60 Hz / input): analog input: Pixel clock up to 170 MHz / input digital input: Pixel clock up to ca. 288 MHz / input (depending on the signal) Single input mode (up to 2048×2048@60 Hz): analog input: Pixel clock up to 340 MHz digital input: Pixel clock up to 330 MHz Hsync+Vsync, Csync, Sync-on-Green Sync level 1 V – 5 V / TTL
colors	15 bpp / 32K, 16 bpp / 64K, 24 bpp / 16M
input formats	SDTV analog Composite, S-video HDTV analog and digital YPrPb, YCrCb, RGB RGB analog and digital
bus	PCI bus, 32bit / 33 MHz, 64bit / 66 MHz
power supply	5 V ($\pm 2\%$), 3.3 V (± 0.3 V), 12 V ($\pm 10\%$), -12 V ($\pm 10\%$)
power consumption	5 V / 2.8 A, 3.3 V / 3.5 A, -12 V / 100 mA
operating conditions	0 .. 50° C at 8% - 80% humidity, non-condensing
dimensions	PCI long-card, 312.00 mm x 121.92 mm
weight	208 g
connectors	1 × 64 bit, 3.3/5 V PCI edge connector 1 × DVI-I dual link connector 1 × DVI-I connector

Table 7-11

Dual RGB Input Card

A/D converter	2 x Analog Devices AD9888	
scaler	via scaler algorithm in FPGA	
CPU-/Frame-Memory	64MB SDRAM	
input	up to SXGA 1280×1024@75 Hz / input: Pixel clock 20 MHz – 135 MHz / input Line frequency 15 kHz – 115 kHz / input Hsync+Vsync, Csync, Sync-on-Green Sync level 1 V – 5 V / TTL	
colors	15 bpp / 32K, 16 bpp / 64K, 24 bpp / 16M	
internal frame rate		
input timing:	max. frame rate with internal color depth of 16 bpp and 24 bpp dual input mode (also other combinations, if considering pixel clock and line frequency requirements):	
1280x1024@60Hz and textmode@70Hz 2 x 1280x1024@60Hz 2 x 1280x1024@75Hz	2 x 30Hz at 16 bpp 2 x 30Hz at 16 bpp 2 x 37Hz at 16 bpp	2 x 20Hz at 24 bpp 2 x 20Hz at 24 bpp 2 x 25Hz at 24 bpp
bus	PCI bus, 32bit / 33 MHz, 64bit / 66 MHz	
power supply	5 V (±2%), 3.3 V (±0.3 V), -12 V (±10%)	
power consumption	5 V / 1.5 A, 3.3 V / 1.6 A, -12 V / 100 mA	
operating conditions	0 .. 50° C at 8% - 80% humidity, non-condensing	
dimensions	PCI long-card, 312.00 mm x 121.92 mm	
weight	425 g	
connectors	1 x 64 bit, 3,3/5 V PCI edge connector 2 x 15-pin SubMiniD HD connector, VGA compatible	

Table 7-12

Presets of Dual RGB Input Card and Dual DVI Input Card

Default Presets (file: `/opt/MMT2686/etc/xvideo/presets.prs`).

Presets with PRESET_TYPE=2 identifies its use for the DUAL RGB INPUT CARD and with PRESET_TYPE=3 its use for the DUAL DVI INPUT CARD. The FRAME_REDUCTION has for each preset with PRESET_TYPE=2 the value 6 and for each preset with PRESET_TYPE=3 the value 128.

The H_POS value contains "Hor Sync Time" + "H Back Porc" + "H Left Border".

	P_LL_DIVIDER	H_SIZE	V_TOT	V_SIZE	V_PERIOD	V_POS	H_POS	H_POL	V_POL	SYNC_MODE	ADC_PHASE
[640x350@70Hz]	800	640	449	350	14285	60	137	1	1		16
[640x350@85Hz]	832	640	445	350	11764	63	160	0	1		16
[640x400@70Hz]	800	640	450	400	14285	35	137	1	1		16
[640x400@85Hz]	832	640	445	400	11764	44	160	1	0		16
[640x480@60Hz]	800	640	525	480	16666	35	144	1	1		24
[640x480@72Hz]	832	640	520	480	13888	31	168	1	1		24
[640x480@75Hz]	840	640	500	480	13333	19	184	1	1		8
[640x480@85Hz]	832	640	509	480	11764	28	136	1	1		24
[720x400@70Hz]	900	720	449	400	14285	36	154	1	0		16

	PILL_DIVIDER	H_SIZE	V_TOT	V_SIZE	V_PERIOD	V_POS	H_POS	H_POL	V_POL	SYNC_MODE	ADC_PHASE
[720x400@85Hz]	936	720	446	400	11764	45	180	1	0		16
[800x600@56Hz]	1024	800	625	600	17857	24	200	0	0		24
[800x600@60Hz]	1056	800	628	600	16666	27	216	0	0		16
[800x600@72Hz]	1040	800	666	600	13888	29	184	0	0		12
[800x600@75Hz]	1056	800	625	600	13333	24	240	0	0		16
[800x600@85Hz]	1048	800	631	600	11764	30	216	0	0		16
[1024x768@43Hz]	1264	1024	817	768	23256	24	232	0	0		16
[1024x768@60Hz]	1344	1024	806	768	16666	35	296	1	1		8
[1024x768@70Hz]	1328	1024	806	768	14285	35	280	1	1		8
[1024x768@75Hz]	1312	1024	800	768	13333	31	272	0	0		8
[1024x768@85Hz]	1376	1024	808	768	11764	39	304	0	0		
[1152x864@60Hz]	1520	1152	895	864	16666	31	282	1	0		1
[1152x864@70Hz]	1536	1152	900	864	14286	36	287	1	0		3
[1152x864@75Hz]	1600	1152	900	864	13333	35	384	0	0		22
[1152x864@85Hz]	1552	1152	907	864	11765	43	297	1	0		6
[1152x900@66Hz]	1504	1152	937	900	15152	31	311	0	1	1	1
[1152x900@76Hz]	1464	1152	943	900	13158	33	278	0	1	1	28
[1280x768@60Hz]	1712	1280	994	768	16670	129	327	1	0	0	1
[1280x768@75Hz]	1712	1280	802	768	13333	34	324	1	0		22
[1280x768@85Hz]	1728	1280	807	768	11765	39	328	1	0		15
[1280x800@60Hz]	1712	1280	994	800	16670	113	327	1	0	0	1
[1280x900@70Hz]	1800	1280	1000	960	14286	40	408	0	0		
[1280x960@60Hz]	1800	1280	1000	960	16666	39	424	0	0		22
[1280x960@70Hz]	1728	1280	999	960	14286	39	329	1	0		5
[1280x960@75Hz]	1686	1280	1000	960	13333	39	386	0	0		
[1280x960@85Hz]	1728	1280	1011	960	11764	50	384	0	0		
[1280x1024@60Hz]	1688	1280	1066	1024	16666	41	360	0	0		22
[1280x1024@70Hz]	1728	1280	1066	1024	14286	42	326	1	0		26
[1280x1024@75Hz]	1688	1280	1066	1024	13333	31	392	0	0		8
[1280x1024@85Hz]	1728	1280	1072	1024	11764	47	384	0	0		10
[1400x1050@60Hz]	1875	1400	1087	1050	16630	36	391	0	0		4
[1400x1050@70Hz]	1793	1400	1067	1050	14286	17	359	1	1		8
[1600x1200@60Hz]	2160	1600	1250	1200	16666	49	496	0	0		
[1600x1200@65Hz]	2160	1600	1250	1200	15384	49	496	0	0		
[1600x1200@70Hz]	2160	1600	1250	1200	14285	49	496	0	0		
[1600x1200@75Hz]	2160	1600	1250	1200	13333	49	496	0	0		
[1600x1200@85Hz]	2160	1600	1250	1200	11764	49	496	0	0		
[1680x1050@60Hz]	2272	1680	1304	1050	16666	148	479	0	0		

	PILL_DIVIDER	H_SIZE	V_TOT	V_SIZE	V_PERIOD	V_POS	H_POS	H_POL	V_POL	SYNC_MODE	ADC_PHASE
[1792x1344@60Hz]	2448	1792	1394	1344	16666	49	528	1	0		
[1792x1344@75Hz]	2456	1792	1417	1344	13333	72	568	1	0		
[1792x1344@85Hz]	2464	1792	1411	1344	11765	67	462	1	0		2
[1800x1440@60Hz]	2456	1800	1490	1440	16666	50	474	1	0		15
[1800x1440@70Hz]	2472	1800	1499	1440	14286	59	471	1	0		15
[1800x1440@75Hz]	2472	1800	1503	1440	13333	63	466	1	0		15
[1856x1392@60Hz]	2528	1856	1439	1392	16666	47	522	1	0		4
[1856x1392@72Hz]	2544	1856	1450	1392	13888	58	478	1	0		15
[1856x1392@75Hz]	2560	1856	1500	1392	13333	107	576	1	0		
[1920x1080@60Hz]	2576	1920	1118	1080	16666	38	494	1	0		11
[1920x1080@75Hz]	2608	1920	1128	1080	13333	48	498	1	0		6
[1920x1200@60Hz]	2592	1920	1242	1200	16666	42	496	1	0		9
[1920x1200@75Hz]	2624	1920	1253	1200	13333	53	499	1	0		6
[1920x1200@85Hz]	2640	1920	1260	1200	11765	60	497	1	0		1
[1920x1440@60Hz]	2600	1920	1500	1440	16666	59	552	1	0		
[1920x1440@75Hz]	2640	1920	1500	1440	13333	60	502	1	0		1
[2048x1536@45Hz]	2804	2048	1600	1536	22222	63	600	1	1		
[2048x1536@60Hz]	2800	2048	1589	1536	16680	53	534	1	0		8
[2048x1536@66Hz]	2816	2048	1595	1536	15152	59	534	1	0		6
[2048x2048@45Hz]	2804	2048	2114	2046	22222	59	709	1	1		

Table 7-13

Presets for component formats YUV with DUAL DVI INPUT CARD:

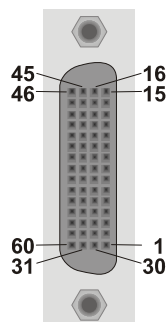
	PILL_DIVIDER	H_SIZE	V_TOT	V_SIZE	V_PERIOD	V_POS	H_POS	H_POL	V_POL	SYNC_MODE	ADC_PHASE	SOG_LEVEL	HV_LEVEL
[720x480@30i]	864	720	525	480	33350	35	145	0	1	1	25	15	127
[720x480@60p]	880	720	525	480	16670	37	142	0	1	1	22	15	127
[720x576@25i]	872	720	625	576	39990	41	156	0	1	1	0	15	127
[720x576@50p]	896	720	625	576	19990	43	156	0	1	1	22	15	127
[1280x720@50p]	1984	1280	750	720	19980	22	264	0	1	1	8	15	127
[1280x720@60p]	1704	1280	750	720	16670	22	292	0	1	1	22	15	127
[1920x1080@25i]	2664	1920	1125	1080	39980	34	204	0	1	1	22	15	127
[1920x1080@30i]	2240	1920	1125	1080	33350	36	217	0	1	1	22	15	127

Table 7-14

7.2 Interfaces

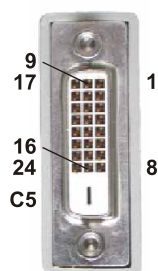
Seen from outside of TRANSFORM A.

UGX Graphic Card, digital and analog out

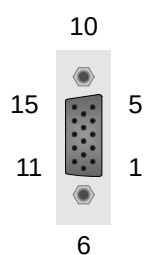


46	GND (shield, return for +5V, Hsync and Vsync)	45	0 - Data1+	16	0 - Data0+	15	GND
47	0 - green	44	0 - Data1-	17	0 - Data0-	14	0 - red
48		43	0 - Clock+	18	0 - Data2+	13	0 - blue
49	GND	42	0 - Clock-	19	0 - Data2-	12	GND
50	0 - Hsync	41		20		11	0 - +5V Power
51	0 - Vsync	40	0 - Hot Plug detect	21		10	0 - DDC clock
52	GND	39	0 - LED PGA	22		9	0 - DDC data
53		38	Scaler detect	23	Int Scaler	8	GND
54	GND	37	1 - LED PGA	24		7	1 - DDC data
55	1 - Vsync	36	1 - Hot Plug detect	25		6	1 - DDC clock
56	1 - Hsync	35		26		5	1 - +5V Power
57	GND	34	1 - Clock-	27	1 - Data2-	4	GND
58		33	1 - Clock+	28	1 - Data2+	3	1 - blue
59	1 - green	32	1 - Data1-	29	1 - Data0-	2	1 - red
60	GND	31	1 - Data1+	30	1 - Data0+	1	GND

Figure 7-1
Dual-DVI connector digital/analog out

Dual-DVI to 2xDVI-D adapter cable

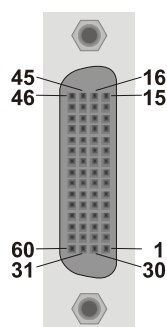
17	Data0-	9	Data1-	1	Data2-
18	Data0+	10	Data1+	2	Data2+
19	Data0 Shield	11	Data1 Shield	3	Data2 Shield
20		12		4	
21		13		5	
22	Clock Shield	14	+5V Power	6	DDC Clock
23	Clock+	15	Ground (return for +5V)	7	DDC Data
24	Clock-	16	Hot Plug Detect	8	
		C5			

Figure 7-2
DVI-D connector**Dual-DVI to 2xCRT adapter cable**

1	red	6	red GND	11	
2	green	7	green GND	12	DDC data
3	blue	8	blue GND	13	Hsync
4		9	+5V Power	14	Vsync
5	GND	10	GND	15	DDC clock

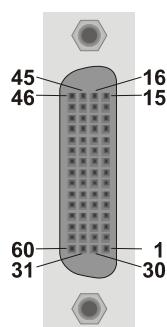
Figure 7-3
CRT connector

OmniScaler digital in

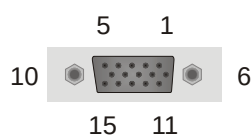


46	GND (shield, return for +5V)	45	1 - Data1+	16	1 - Data0+	15	GND
47		44	1 - Data1-	17	1 - Data0-	14	
48		43	1 - Clock+	18	1 - Data2+	13	
49	GND	42	1 - Clock-	19	1 - Data2-	12	GND
50		41		20		11	
51		40	1 - Hot Plug detect	21		10	1 - DDC clock
52	GND	39	1 - LED PGA	22		9	1 - DDC data
53		38	Scaler detect	23	Int Scaler	8	GND
54	GND	37	0 - LED PGA	24		7	0 - DDC data
55		36	0 - Hot Plug detect	25		6	0 - DDC clock
56		35		26		5	
57	GND	34	0 - Clock-	27	0 - Data2-	4	GND
58		33	0 - Clock+	28	0 - Data2+	3	
59		32	0 - Data1-	29	0 - Data0-	2	
60	GND	31	0 - Data1+	30	0 - Data0+	1	GND

Table 7-15
Dual-DVI connector digital in

OmniScaler digital out

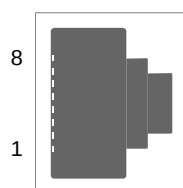
46	GND (shield, return for +5V, Hsync and Vsync)	45	0 - Data1+	16	0 - Data0+	15	GND
47		44	0 - Data1-	17	0 - Data0-	14	
48		43	0 - Clock+	18	0 - Data2+	13	
49	GND	42	0 - Clock-	19	0 - Data2-	12	GND
50		41		20		11	0 - +5V Power
51		40	0 - Hot Plug detect	21		10	0 - DDC clock
52	GND	39	0 - LED PGA	22		9	0 - DDC data
53		38	Scaler detect	23	Int Scaler	8	GND
54	GND	37	1 - LED PGA	24		7	1 - DDC data
55		36	1 - Hot Plug detect	25		6	1 - DDC clock
56		35		26		5	1 - +5V Power
57	GND	34	1 - Clock-	27	1 - Data2-	4	GND
58		33	1 - Clock+	28	1 - Data2+	3	
59		32	1 - Data1-	29	1 - Data0-	2	
60	GND	31	1 - Data1+	30	1 - Data0+	1	GND

Figure 7-4
Dual-DVI connector digital out**Onboard VGA adapter**

1	red	6	red GND	11	
2	green	7	green GND	12	
3	blue	8	blue GND	13	HSYNC
4		9		14	VSYSN
5		10	sync GND	15	

Figure 7-5

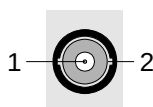
Streaming Video Card



1	TD+	5	
2	TD-	6	RD-
3	RD+	7	
4		8	

Figure 7-6
RJ-45 connector, Streaming video card

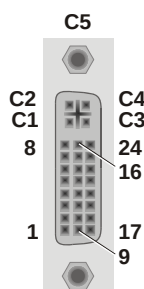
Quad SDI Video Card or Quad Analog Video Card



1	Signal
2	Shield

Figure 7-7
BNC connector, QUAD SDI VIDEO CARD or QUAD ANALOG VIDEO CARD

Dual DVI Input Card



C2	Analog Green	C5	Analog Ground (analog R, G, & B return)	C4	Analog HSync
C1	Analog Red			C3	Analog Blue
8	Analog VSync	16	Hot Plug Detect	24	TMDS Clock-
7	DDC Data	15	Ground (return for +5V, Hsync, and Vsync)	23	TMDS Clock+
6	DDC Clock	14	+5V	22	TMDS Clock Shield
5	TMDS Data4+ ¹⁾	13	TMDS Data3+ ¹⁾	21	TMDS Data5+ ¹⁾
4	TMDS Data4- ¹⁾	12	TMDS Data3- ¹⁾	20	TMDS Data5- ¹⁾
3	TMDS Data2, 4 shield	11	TMDS Data1, 3 shield	19	TMDS Data0, 5 shield
2	TMDS Data2+	10	TMDS Data1+	18	TMDS Data0+
1	TMDS Data2-	9	TMDS Data1-	17	TMDS Data0-

Figure 7-8
DVI-I connector
1) Dual link pins 4, 5, 12, 13, 20, 21 only connected at In1

Dual RGB Input Card in

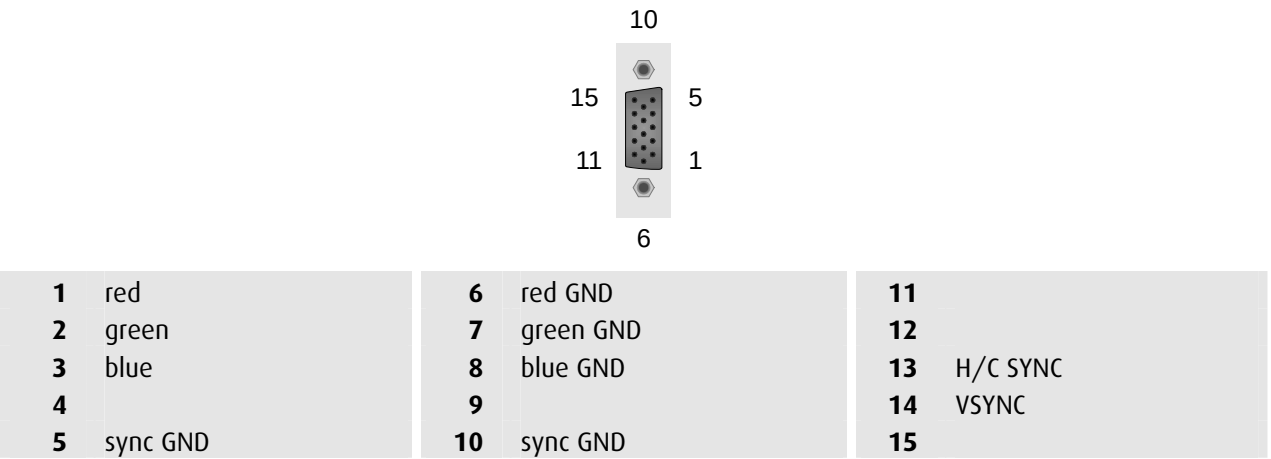


Figure 7-9

PS/2 Keyboard and PS/2 Mouse

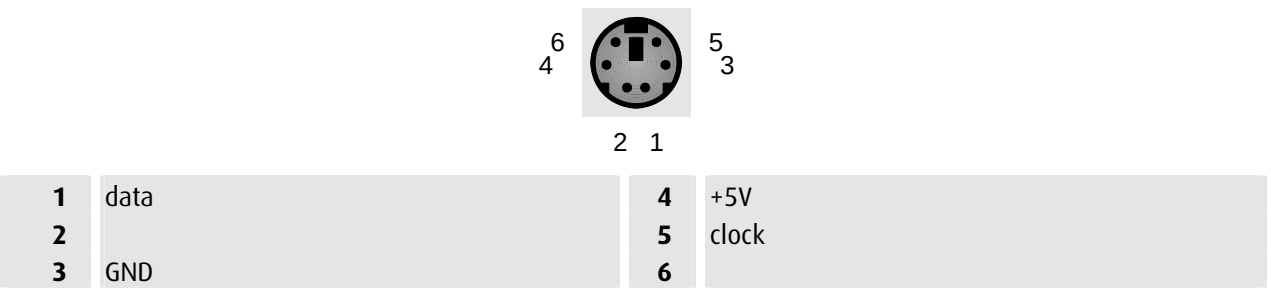


Figure 7-10

COM1

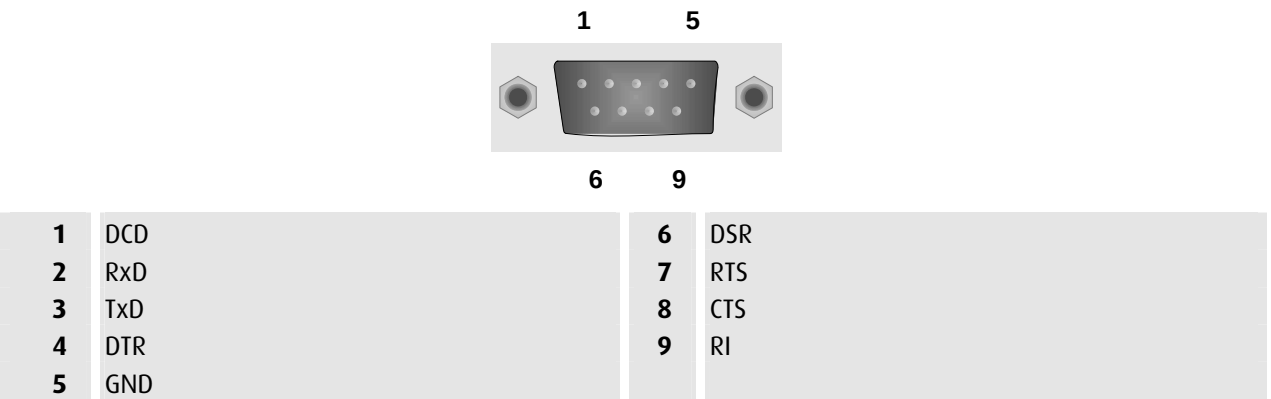


Figure 7-11

Multiport I/O Card

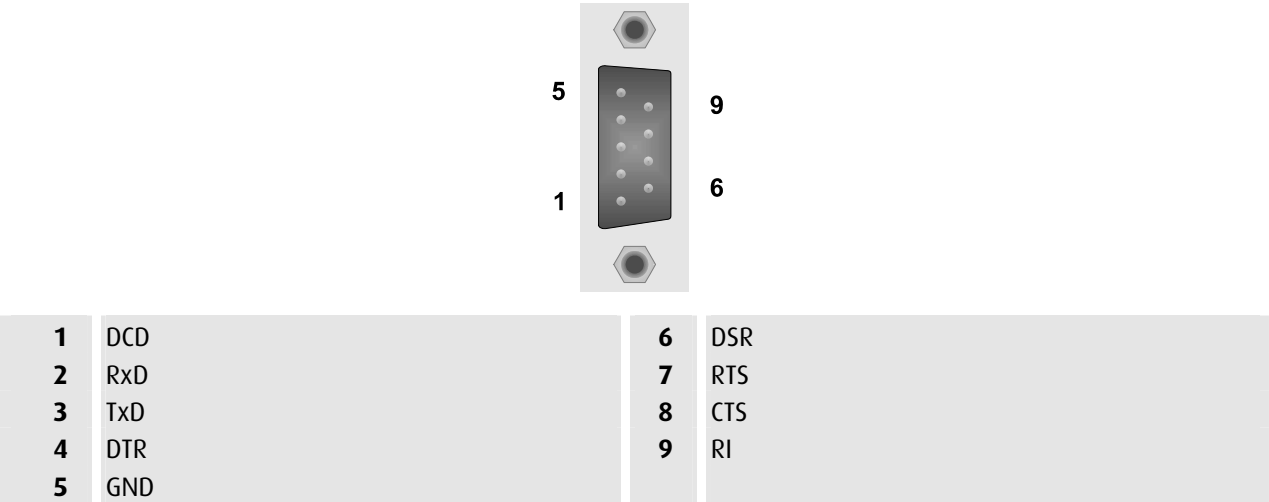


Figure 7-12
serial connector pin assignment

Network card and onboard LAN adapter

For complete cabling details, please refer to the **IEEE802.3** specification, section 8.4, **Coaxial Cables and Electrical Parameters**.

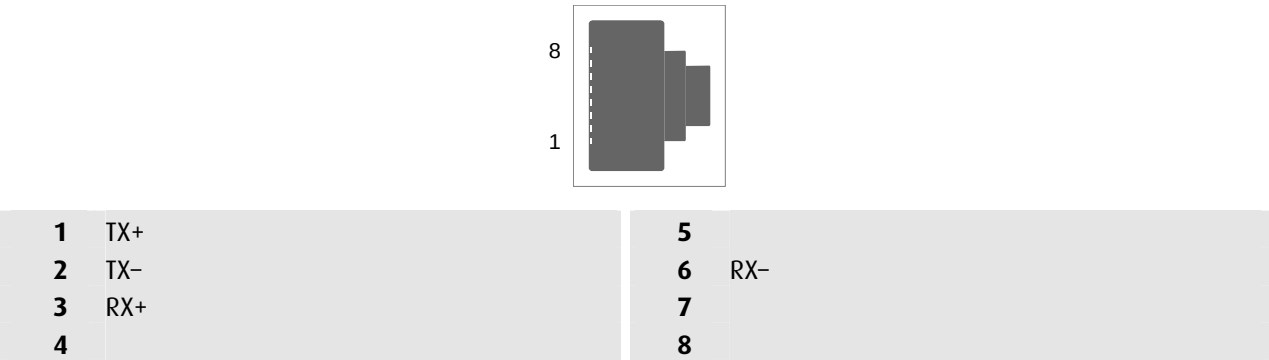
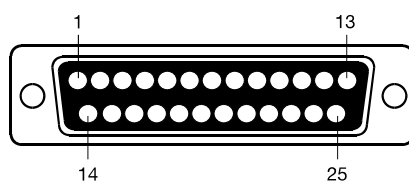


Figure 7-13
RJ-45 connector pin assignments

Connection cable (keyboard extension)

Plug 1	twisted pairs	Plug 2
1	1 and 14	1
2	2 and 15	2
3	3 and 16	3
	etc.	
13	–	13
	etc.	
23	23 and 10	23
24	24 and 11	24
25	25 and 12	25
Shield connected to plug housing		Shield connected to plug housing
Ferrit		Ferrit

Figure 7-14

7.3 Order codes

Documentation	
DOC-3265-2	user's manual TRANSFORM A – X Terminal, English
OVT-2686-7	CD-ROM medium: TRANSFORM A, documentation & supplement for X Terminal
R5976144	user's manual OSIRIS
Hardware	
AGS-3328-2	PROCESSOR, Pentium IV 3.4 GHz, 19 In., 6 PCI slots, standard
AGS-3328-3	PROCESSOR, Pentium IV 3.4 GHz, 19 In., 6 PCI slots, with redundant power supply
AGS-3389-0	PROCESSOR, Pentium IV 3.6 GHz, 19 In., 4 PCI slots, 3 PCIe slots, standard
AGS-3389-1	PROCESSOR, Pentium IV 3.6 GHz, 19 In., 4 PCI slots, 3 PCIe slots, with redundant power supply
AGS-3389-2	PROCESSOR, Core 2 Duo 2.13 GHz, 19 In., 4 PCI slots, 3 PCIe slots, standard
AGS-3389-3	PROCESSOR, Core 2 Duo 2.13 GHz, 19 In., 4 PCI slots, 3 PCIe slots, with red. power supply
AGS-3390-2	PROCESSOR single Xeon Dual-Core, 19 In., 6 PCI slots, with redundant power supply
AGS-3359-0	OMNIBUS A12, 19 In., with redundant power supply
AGS-3335-0	OMNIBUS A18, 19 In., standard, hot-swappable fans
AGS-3335-1	OMNIBUS A18, 19 In., redundant power supply, hot-swappable fans
EOS-3193-1	EXTENDER, 13 slots, 19 In., with redundant power supply
DRV-3349-0	hard drive PATA in removable frame for AGS-3328 ; order options (please indicate): X.11 preinstalled operating system (X server) english language of user's manual: English
DRV-3310-0	RAID 1 controller PATA, including 2 hard drives for AGS-3328 , AGS-3389 , AGS-3390 order options (please indicate): X.11 preinstalled operating system (X server) english language of user's manual: English
DRV-3393-0	hard drive SATA in removable frame for AGS-3389 , AGS-3390 order options: X.11 preinstalled operating system (X server) english language of user's manual: English
DRV-3394-0	RAID 1 controller SATA, including 2 hard drives for AGS-3389 , AGS-3390 order options: X.11 preinstalled operating system (X server) english language of user's manual: English
DRV-3402-1	RAID 5 controller SATA, including 3 hard drives for AGS-3389 , AGS-3390 order options: X.11 preinstalled operating system (X server) english language of user's manual: English
R9861443	Solid state drive SATA in removable frame for AGS-3389 , AGS-3390 order options: X.11 preinstalled operating system (X server) english language of user's manual: English
DRV-3356-0	DVD-ROM drive for software upgrades
AGX-3281-1	UGX GRAPHIC CARD with DVI-D adapter cable, digital AGX-3281-0: UGX GRAPHIC CARD for TRANSFORM A, Dual-DVI connector, 4 channels CBL-3242-0: Dual-DVI to 2xDVI-D adapter cable
AGX-3281-2	UGX GRAPHIC CARD with CRT adapter cable, analog AGX-3281-0: UGX GRAPHIC CARD for TRANSFORM A, Dual-DVI connector, 4 channels CBL-3243-0: Dual-DVI to 2xCRT adapter cable
AGX-3313-1	OMNISCALE with Dual-DVI cable, digital AGX-3313-0: OMNISCALE, Dual-DVI connector, 2 channels CBL-3264-0: Dual-DVI to Dual-DVI cable

R9842979	QUAD SDI VIDEO CARD
R9842978	STREAMING VIDEO CARD SVC-1
R9832670	STREAMING VIDEO CARD SVC-2
R9842986	QUAD ANALOG VIDEO CARD
R9842987	DUAL RGB INPUT CARD
R9842985	DUAL DVI INPUT CARD
NET-3283-0	Ethernet card 10/100/1000 Mbps, PCI
NET-3283-3	Ethernet card 10/100/1000 Mbps, PCI, server
NET-3395-0	Ethernet card 10/100/1000 Mbps, PCIe x1
NET-3395-2	Ethernet card 10/100/1000 Mbps, PCIe x1, server
E05-3052-1	Multiport-I/O card
TAS-3232-0	Logitech USB optical mouse with PS/2 adapter, 2.5m cable
WST-3336-0	USB Keyboard, English
TAS-3401-0	USB PC-keyboard/USB mouse extension with 20 m RJ-45 extension cable (CBL-3380-5)
TAS-3401-1	USB PC-keyboard/USB mouse extension with 50 m RJ-45 extension cable (CBL-3380-6)
NET-2826-1	Gigabit Ethernet Switch, 8 ports

Spare parts

MEM-3213-5	memory 256MB DDR RAM-DIMM for AGS-3328
MEM-3213-6	memory 512MB DDR RAM-DIMM for AGS-3328
MEM-3391-0	memory 512MB DDR2 RAM-DIMM for AGS-3389
MEM-3391-1	memory 1GB DDR2 RAM-DIMM for AGS-3389
R9842976	memory 1GB DDR2 FB DIMM for AGS-3390-2
PSU-3284-0	spare power module for PROCESSOR AGS-3389-1/-3/AGS-3328-3/AGS-3390-2 or EXTENDER E05-3193-1
PCX-3363-9	spare power module 600 W for OMNIBUS A12 AGS-3359
PCX-3321-0	spare power module 600 W for OMNIBUS A18 AGS-3335-1
PCX-3342-0	spare fan module for OMNIBUS A18 AGS-3335
DRV-3349-9	spare hard disk drive PATA in removable frame without operating system for PROCESSOR AGS-3328
DRV-3310-9	spare hard disk drive PATA for RAID 1 in removable frame without operating system for PROCESSOR AGS-3328 (or AGS-3389/AGS-3390)
DRV-3393-9	spare hard disk drive SATA in removable frame without operating system for PROCESSOR AGS-3389/AGS-3390
DRV-3394-9	spare hard disk drive SATA for RAID 1 in removable frame without operating system for PROCESSOR AGS-3389/AGS-3390
DRV-3402-9	spare hard disk drive SATA for RAID 5 in removable frame without operating system for PROCESSOR AGS-3389/AGS-3390
E05-3104-0	dust filter for PROCESSOR
E05-3104-1	dust filter for OMNIBUS A12 and EXTENDER
PCX-3225-0	dust filter for OMNIBUS A18

Cables and adapters

	graphics data:
CBL-3206-0	DVI-D <=> DVI-D, max. UXGA, 2 m
CBL-3206-2	DVI-D <=> DVI-D, max. UXGA, 5 m
CBL-3206-3	DVI-D <=> DVI-D, max. SXGA+, 10 m
CBL-3206-4	DVI-D <=> DVI-D, max. SXGA+, 20 m
R9842989	DVI-D -> DVI-D optical, max. UXGA, 10 m
R9842990	DVI-D -> DVI-D optical, max. UXGA, 20 m
R9842991	DVI-D -> DVI-D optical, max. UXGA, 50 m
R9842992	DVI-D -> DVI-D optical, max. UXGA, 100 m
CBL-3242-0	Dual-DVI -> 2xDVI-D adapter cable
CBL-3243-0	Dual-DVI -> 2xCRT adapter cable
CBL-3264-0	Dual-DVI <=> Dual-DVI cable, 0.5 m
CBL-3264-1	Dual-DVI <=> Dual-DVI cable, 1.5 m

CBL-3205-0	DVI-D → MDR26 adapter, 0.2 m
R9842821	3×RCA → DVI-A analog video cable, 3 m, for DUAL DVI INPUT CARD
R9842822	3×RCA → DVI-A analog video cable, 7.5 m, for DUAL DVI INPUT CARD
R9842823	3×RCA → DVI-A analog video cable, 15 m, for DUAL DVI INPUT CARD
R9842824	3×RCA → DVI-A analog video cable, 30 m, for DUAL DVI INPUT CARD
CBL-3190	HD15 → DVI-A adapter, for DUAL DVI INPUT CARD
R9842825	5×BNC → DVI-A adapter cable, 0.75 m, for DUAL DVI INPUT CARD
R9842826	HDMI → DVI-D adapter, for DUAL DVI INPUT CARD
CBL-3380-2	Remote power on/off cable
Software	
OVT-2686-1	CD-ROM Medium: TRANSFORM A, system disk
OVT-2686-7	CD-ROM medium: TRANSFORM A, documentation & supplement for X Terminal
E05-3070-5	TRANSFORM A base license Processor configuration
LIC-3291-0	TRANSFORM A base license OmniBus configuration and distributed X server configuration
LIC-3291-2	driver license per graphic channel of UGX GRAPHIC CARD

Table 7-16

8 Troubleshooting

Check this chapter for help, if your TRANSFORM A does not boot properly and for information how to contact the technical support of Barco.

8.1 TransForm A not booting

When TRANSFORM A is not booting properly it is important to state at which point of the boot process a fault occurs. The display while booting is as follows, so you can see where the process is stopped.

On the first display (**board 1/port 0**, see section 3.2.5 Graphic cards), respectively on the central unit's VGA monitor:

```
M3 PCI 128b
DDCinfo: Native DFC resolution is 1024x768@68Hz
ARGUS AGX-3000
VGA BIOS-3000-04    06.08.02    COPYRIGHT © 2002 BARCO Control Rooms
PCX-3000[0] -> MIPS RAM Base: $F0000000 -> Number of VGAs: 0
PCX-3000[1] -> MIPS RAM Base: $E6000000 -> Number of VGAs: 6 (PGA inside)
Total amount of VGAs: 6
Scan system for AGX-3000
Dev BP Bus Slot
=== == === =====
 0 1 3 0 init... BAS: $1C000008/$0000B401/$48640000 done PGA
 1 1 3 1 init... BAS: $20000008/$0000B401/$48644000 done
 2 1 8 0 init... BAS: $2C000008/$0000B401/$48720000 done
 3 1 8 1 init... BAS: $30000008/$0000B401/$48724000 done
 4 1 11 0 init... BAS: $38000008/$0000B401/$48C40000 done
 5 1 11 1 init... BAS: $3C000008/$0000B401/$48C44000 done
```

The ordinary self test report of a PC is displayed.

The other displays show their respective bus and slot no., e. g.:

```
M3 PCI 128b
ARGUS AGX-3000
VGA BIOS-3000-04    06.08.02    COPYRIGHT © 2002 BARCO Control Rooms
Dev: 1, BP: 1, PCI Bus: 3, Slot: 1 BAS: $20000008/$0000B401/$48644000
DDCinfo: Native DFP resolution is 1024x768@68Hz
```

fault	cause/steps
boot process is aborted while Dev BP Bus Slot === == === ===== 0 1 3 0 init... BAS: \$1C000008 ↳ /\$0000B401/\$48640000 done PGA 1 1 3 1 init... BAS: \$20000008 ↳ /\$0000B401/\$48644000 done etc. is displayed.	There is probably a problem with the graphic cards. Ask an authorized person to make sure that all graphic cards are inserted correctly. If the fault remains, contact Barco, please.
boot process is aborted CMOS checksum error appears on the display	The battery is empty. Ask an authorized person to replace it by a fresh one.
boot process is aborted, This PC has no hard disk or hard disk is unreadable. SYSTEM HALTED appears on the display	Check the removable frame of the hard disk drive, if it is inserted properly and locked. If the error message remains after restarting TRANSFORM A, contact Barco, please.
boot process is aborted, Unable to read system configuration Press <F1> to resume or <F2> for setup. appears on the display	In some Processor configurations with the PROCESSOR AGS-3390 the BIOS has problems to allocate system resources during BIOS initialization. Usually this does not impair normal system operation. Press <F1> or disable the option "Halt on all errors" in the BIOS setup.

Table 8-1

8.2 TransForm A does not boot from CD

Check if booting from CD is enabled in the mainboard BIOS setup. CD needs to have higher booting order than the hard drive.

8.3 Hot line

Feel free to contact us if you have any further questions!

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E-mail: support.controlrooms@barco.com, Web: www.barcocontrolrooms.com

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